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ABSTRACT

In 1990, the National Education Goals Panel--six governors, four members of the President's administration, and four members of Congress--enlisted the aid of six resource groups (RGs) of educators, business people, and technical experts in identifying: which indicators best measure progress toward six national education goals, data for the panel's first annual progress report in September 1991, and the content of future progress reports. Each RG included between 8 and 10 members. The six goals state that by the year 2000: (1) all children in the United States will start school ready to learn; (2) the high school graduation rate will increase to at least 90%; (3) U.S. students will leave grades 4, 8, and 12 having shown competency in challenging subject matter including English, mathematics, science, history, and geography, and every U.S. school will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in the modern economy; (4) students in the United States will be first in the world in science and mathematics achievement; (5) very U.S. adult will be literate and will have the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship; and (6) every U.S. school will be free of drugs and violence and will offer a disciplined environment conducive to learning. This document presents six RG interim reports corresponding to the six goals. The reports highlight ways of measuring and monitoring the nation's/states' progress toward meeting these goals. Lists of the membership of each RG and instructions and a form for submitting public testimony for panel consideration are included. (RLC)

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National Education Goals Panel

Measuring Progress Toward the National Education Goals:

Potential Indicators and Measurement Strategies

Compendium of Interim Resource Group Reports

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
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March 25, 1991

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TABLE OF CONTENTS

INTRODUCTION iii

RESOURCE GROUP INTERIM REPORTS

Chapter 1: Readiness for School 1
An Interim Report From the Resource Group on School Readiness

Chapter 2: High School Completion 17
An Interim Report From the Resource Group on School Completion

Chapter 3: Student Achievement and Citizenship 37
An Interim Report From the Resource Group on Student Achievement and Citizenship

Chapter 4: Science and Mathematics 53
An Interim Report From the Resource Group on Science and Mathematics

Chapter 5: Adult Literacy and Lifelong Learning 81
An Interim Report From the Resource Group on Adult Literacy and Lifelong Learning

Chapter 6: Safe, Disciplined, and Drug-Free Schools 99
An Interim Report From the Resource Group on Safe, Disciplined, and Drug-Free Schools

PUBLIC TESTIMONY 125
Public Testimony Form

INTRODUCTION

In 1990 the President and Governors of the United States agreed upon the six National Education Goals. Their purpose was to help improve the quality of education by setting high standards and focusing attention on how well our society is able to achieve them. The National Education Goals Panel, composed of six Governors, four members of the President's Administration, and four members of the United States Congress, was established to report on the Nation's and States' progress towards meeting these goals.

Resource Group Reports

The Panel asked six Resource Groups of nationally recognized educators, business people and technical experts to help them identify what indicators would best measure progress towards each of the six goals. These Resource Groups were assigned two principal tasks:

- To identify what data are available to report upon in the first annual Progress Report (September 1991); and
- To suggest a vision, unconstrained by the limitations of current data, of what would be desirable and needed for Progress Reports in the future.

The Resource Groups met from January through March of 1991 to discuss these issues. Their ideas were transmitted to the Panel at its meeting on March 25. This Compendium of Resource Group Interim Reports is the initial product of the Resource Groups' deliberations. A companion report, the Discussion Document, includes abstracts of the full reports and is available upon request. Please address your inquiries to:

National Education Goals Panel
1850 M Street NW, Suite 270
Washington, DC, 20036

Chapter 1
Readiness for School

An Interim Report From the Resource Group on School Readiness

GOAL 1: By the year 2000, all children in America will start school ready to learn.

Objectives:

- All disadvantaged and disabled children will have access to high quality and developmentally appropriate preschool programs that help prepare children for school.
- Every parent in America will be a child's first teacher and devote time each day helping his or her preschool child learn; parents will have access to the training and support they need.
- Children will receive the nutrition and health care needed to arrive at school with healthy minds and bodies, and the number of low birthweight babies will be significantly reduced through enhanced prenatal health systems.

In early 1991, a Resource Group on School Readiness was convened by the Panel to recommend indicators and strategies for measuring progress toward achieving this goal. Members of the group are as follows:

Ernest L. Boyer	The Carnegie Foundation for the Advancement of Teaching, Princeton, New Jersey (convener)
James P. Comer	Yale University, New Haven, Connecticut
Donna Foglia	Evergreen School District, San Jose, California
Sharon Lynn Kagan	Yale University, New Haven, Connecticut
Samuel Meisels	University of Michigan, Ann Arbor, Michigan
Lucile F. Newman	Brown University, Providence, Rhode Island
Doug Powell	Purdue University, Lafayette, Indiana
James Wilsford	Orangeburg School District, Orangeburg, South Carolina
Nick Zill	Child Trends, Inc., Washington, D.C.

The Panel and the Goal 1 Resource Group welcome your reactions to the Interim Report on School Readiness.

National Education Goals
Goal One

Readiness for School

I. The Charge

In his first State of the Union message, President Bush announced six goals for all the Nation's schools, which then were endorsed by Governors from all fifty States. Subsequently, the National Governors' Association (NGA), working closely with the White House staff, created a National Education Goals Panel to monitor national and State progress in meeting these new goals. Our assignment, as a resource group to the Panel, was to focus on the first goal, school readiness. Specifically, we were asked to suggest ways to measure progress toward reaching the first goal, propose new assessment tools if needed, and tell the Panel what strategies we do not recommend.

II. Convictions and Cautions

We begin with the conviction that having all children come to school ready to learn is the Nation's most essential education goal. A good beginning for every child is the key to all other goals, and if a solid foundation can be laid in the first years of life, prospects for school success will be dramatically enhanced. Further, there is disturbing evidence that, today, far too many children come to school strikingly disadvantaged, with great handicaps to learning. Giving priority to early childhood development is, we believe, an essential element in preventing such barriers to education.

The concept of "school readiness," while critically important, is difficult to define, and even more difficult to measure. Current assessment tools are very crude, often measuring that which matters least. Further, young children are developmentally not ready to perform skillfully on paper-and-pencil tests. There is a grave danger that, in our eagerness to quantify the learning process, we will put numbers on little children and make inappropriate and destructive judgments about who they are and what they might become.

We also underscore the point that young children develop at different rates. It is extremely risky to gather information at a fixed point in time and then generalize about a child's "readiness." Further, we are deeply concerned about the increased inclination in our culture to rob children of their childhood, to impose academic expectations far too early, and to ask children to conform to predetermined standards. In short, the assessment of young children raises issues that are critically important, both educationally and ethically. Such efforts, however well intended, must be carefully directed and, above all, should avoid doing more harm than good.

With these concerns very much in mind, we fully agree with the panelists who said at the February meeting of the Goals Panel that a national preschool readiness test, a kind of prekindergarten SAT, should not be used. We also conclude that school entry should not be linked to the evaluation of the readiness of young children. And, further, we reject the idea of using assessment measures prematurely to label or track individual students.

Still, caveats notwithstanding, we are convinced that this is an historic moment for American education. National goals are, we believe, critically important, and appropriate ways must be found to measure results. Now is the time to think carefully about school readiness and propose creative new ways to expand, rather than restrict, the opportunities of children. The objectives of such efforts should be to raise public awareness, monitor State and national progress, and guide positive action to improve educational prospects for all children.

III. Defining "Ready to Learn"

As an advisory committee, our first task was to consider the essential question, "What does it mean when we say that `all children should come to school ready to learn?'" Strictly speaking, every child, except the most severely impaired, is ready to learn from the first breath of life. Further, children come to school "ready or not," and many educators insist, quite appropriately, we believe, that classrooms must adjust to meet all needs. Viewed from this perspective, one could argue that the right question is, "Are schools ready for the children?" Still, the handicaps many children now bring to school should not be casually accepted. Our goals should be to have every child born and reared so that his or her capacities for learning will be enhanced, not diminished. Guided by this objective, we agreed that, for the purposes of our assignment, being "ready to learn" means being prepared to participate successfully in formal schooling.

IV. The Dimensions of Readiness

Second, we examined the various dimensions of school readiness and found, not surprisingly, no agreed-upon definition. Many professionals insist that the focus should be primarily on verbal skills; others emphasize general knowledge, while still others look at the child's "developmental maturity" for school. We conclude that readiness does indeed involve the whole child. It relates not just to verbal proficiency, but also to emotional maturity, social skills, attention span, and, at the most fundamental level, the child's physical condition. Specifically, we propose a view of school readiness that embraces the following five dimensions:

- First, Physical well-being. A large and expanding body of research clearly links maternal and child health to school performance. It is clear that such conditions as low birthweight and poor nutrition may, in fact, restrict a child's capacity to learn. We recognize, of course, that some health problems may not have lasting effects on a child's preparedness for school. Still, a child's health is a basic dimension of school readiness, one that must be carefully assessed.

- Second, Emotional maturity. Bonding is a basic human need, and to enter school ready to learn, a child should feel self-confident and secure. He or she needs to be loved and supported by adults in an environment that is stable and secure. A child who is denied emotional support in the first years of life will very likely come to school less well prepared to learn.

- Third, Social confidence. School readiness also means being able to interact successfully with other children and adults. In the classroom, young students must be able to live with group constraints that include taking turns, following directions, and completing other tasks that make possible a creative and productive classroom climate.

- Fourth, Language richness. Proficiency in language is at the heart of learning, and children are aided enormously if they arrive at school linguistically, or, as some might put it, "cognitively," empowered. A child who has been involved with books, who has engaged in conversation with adults, and who has learned to value language is advantaged. School readiness is enormously enhanced for such children.

- Fifth, General knowledge. To live is to learn, and children whose environment has been filled with rich experiences during the preschool years bring great capacity to the classroom. The more young children are exposed to a wide range of activities and creative play, the more knowledge and information they acquire. A strong foundation for further learning is put in place when a child has been encouraged to learn from his or her surroundings.

Clearly, readiness should not be narrowly defined. Rather, it should be viewed as a pattern of qualities, a cluster of conditions and characteristics that, taken together, enable children to take full advantage of the opportunities and demands of formal schooling. We insist that any effort to assess the school readiness of children involve the five essential principles summarized above.

V. Assessing Readiness: What Are the Tools?

This brings us to the crux of the assignment. Is it, in fact, possible to evaluate the school readiness of children? If so, what yardsticks are available now, and what instruments need to be developed?

We conclude that the readiness of children can, in fact, be evaluated. And we also believe that both indirect and direct measures should be used. By indirect measures we mean data that are not derived directly from the child, but that still provide important insights about experiences and influences that affect the child's potential for learning. We are confident that information about children's physical and environmental experiences before they come to school is related directly, and critically, to readiness.

But such information--sometimes called "proxy data"--while valuable, is not sufficient. It can shed light on the degree to which certain important preschool conditions have been met. However, indirect data cannot tell us the extent to which children do, in fact, have the knowledge, skills, and attitudes needed for formal learning. Therefore, we also propose that additional information be gathered directly from children to reveal more precisely how well they have been prepared for school.

In order to gather both direct and indirect data, we recommend monitoring children's readiness at three points: before school, at school entrance, and in school. In the following section, we outline this three-step plan, along with a timetable that spells out what data are available for fall of 1991, and the steps that should be taken to move toward a full report by the year 2000.

A. Before School Assessment

Readiness to learn necessarily begins long before school, even before birth itself, and we conclude that "school readiness" relates to the child's health, to the home environment, and to preschool education. Indeed, the President's and Governors' three "ready-to-learn" objectives focus directly on preschool issues and provide, we believe, an excellent framework for identifying measures that might be used to indicate whether young children are being prepared for formal schooling.

1. Health and Nutrition Factors

Children who are undernourished or who are in poor health are educationally at risk. This fact was recognized by the President and the Governors, who declared: "Children will receive the nutrition and health care needed to arrive at school with healthy minds and bodies, and the number of low birthweight babies will be significantly reduced through enhanced prenatal health systems."

There are, we believe, reliable information sources that can be used to monitor progress toward meeting this objective. And we recommend that the following data bases be considered:

- Birthweight and prenatal care. Vital statistics data collected annually from the States include information from birth certificates. For our purposes, we recommend that two items from this source be used: birthweight and the timing of prenatal care.

- Nutritional status of children. The Nationwide Food Consumption Survey, Continuing Survey of Food Intakes by Individuals, provides the best data on children's nutritional status. In this annual survey, conducted by the U.S. Department of Agriculture, mothers report on their children's diets. We recommend that such data be included in the national assessment of readiness. We also suggest that the Department of Agriculture add questions related to hunger to its survey. If reports on subgroups are desired, it may be necessary for the survey to "oversample" young children. In any event, the current sampling design will have to be changed (not simply enlarged) to yield State-by-State data.

- Children's access to health care. The National Health Interview survey, conducted annually, provides national (but not State-by-State) data patterns about family health care. Using this instrument, households with young children can be identified ("children ages 0-4" is their current classification, but a different cut--say, "children ages 0-6"--could be requested for purposes of the national assessment of readiness). The sampling design, however, must be altered if State-by-State data are desired.

  The National Health and Nutrition Examination Survey (HANES) involves an actual health examination of those in the sample. As currently administered, it could not be used annually or State-by-State. Data from HANES III will be available in 1992, and in 1995, while HANES IV is being planned to provide data for the year 2000. In years when HANES is conducted, results could be included..

2. *Home and Parenting Conditions*

Parents are, or should be, the first and most important teachers, and it is in the home that school readiness is most essentially achieved. These factors were recognized by the President and the Governors when they stated: "Every parent in America will be a child's first teacher and devote time each day helping his or her preschool child learn: parents will have access to the training and support they need."

Here again, there are existing sources that provide data regarding home and parenting conditions. The following points should be considered:

- Parental status. Research indicates that school performance relates to the age and education of the mother. Therefore, we recommend that vital statistics--available annually on a national and State-by-State basis--be used to locate information regarding the age and educational status of the mother.

- Home activities. The National Household Education Survey (NHES) is a promising new instrument that we recommend be used to provide information regarding attitudes and activities in the home. Developed by the Department of Education, this survey asks parents about such activities as reading, television viewing, museum visiting, games or sports, and arts and crafts activities. It also asks about child care and preschool programs. According to the present schedule, national data will be gathered in 1991 and 1993, and then annually.

  We recommend that this important survey be expanded to include other parenting questions. We also recommend that the sample be expanded, annually or at least periodically, to collect data on a State-by-State basis.

  Finally, we recommend that the National Household Education Survey be supplemented periodically through a national subsample for home visits using an instrument like the HOME scale developed by Dr. Bettye Caldwell. This screening procedure, used by home observers, has eight components and is useful for studying the developmental environments of 3- to 6-year-olds.

- Parent education programs. As the President and Governors acknowledged, parent education is significantly related to the school readiness of children. Therefore we urge that the adult education section of the National Home Education Survey be amended to ask specifically about parent education, both formal and informal. Such questions could cite not only adult programs, but also classes parents took when they were students. The focus would be not only on participation, but also on parents' perception of the quality and value of such programs.

3. Preschool Programs

It is well established that access to high-quality preschool programs is of crucial importance in preparing children for school, especially those who are most at risk. We strongly endorse the objective that states, "All disadvantaged and disabled children will have access to high-quality and developmentally appropriate preschool programs that help prepare children for school."

In order to assess national and State progress toward meeting this objective, the following data sources are proposed:

- Participation in preschool programs. The Census Bureau's Current Population Survey has an annual School Enrollment Supplement that provides national data on the participation of low-income children in preschool. State counts are available for children participating in special education programs under the Education for All Handicapped Children Act.

In order to interpret these data, we also need to know how many disadvantaged and disabled children there are in the population as a whole. Fortunately, this information can be derived from the same two sources. Specifically, the current Population Survey can tell us, nationally and on an annual basis, the number of young children living in households with incomes under the federal poverty line. State-by-State data from the current Population Survey could be commissioned periodically.

We should note that definitions of "disabled" vary in early childhood, and no complete census of young disabled children exists. However, an estimate can be derived, if the proportion of disabled among preschool-age children is assumed to be similar to the proportion of disabled among older children (as indicated by State counts of children getting services for disabilities in elementary school).

- Quality of preschool programs. The information now available provides only a small window into the interior of the preschool world. The best, but still limited, source is the Program Information Report Questionnaire sent out annually to all Head Start programs. We recommend that minor alterations be made so that this report can provide information about the quality of Head Start programs.

  A more comprehensive program of data collection on the quality and developmental appropriateness of preschool programs will be needed for the future. We specifically urge the use of recommendations developed by the National Association for the Education of Young Children.

B. School Entrance Assessment

Starting school is--or should be--a significant rite of passage for all children and their families. The events surrounding school entry should, we believe, be more celebrative. Further, the information schools receive about incoming students should be more complete and uniform across the country, since so many children move from one district to another. Therefore, we conclude that school entry, which typically means starting kindergarten, offers a critically important opportunity for the collection of data, one that could greatly expand our "baseline" of knowledge regarding the school readiness of children.

1. A National School Entry Form

Parents are a valuable source of information regarding the readiness of children, especially at the time when school begins. But as things now stand, this opportunity is largely overlooked. Most schools secure little or no information from parents about their children, except perhaps birthdate, address, and vaccination status.

Therefore, we recommend that by 1993 a National School Entry Form be in place as part of the national assessment of school readiness. This new entry form would ask parents or guardians to provide information about their child's birth, health, language or languages, household and family life, as well as about their child's daycare or preschool experience. We also recommend that the entry form welcome parents to the school, remind them of their new responsibilities now that their children are in kindergarten, and advise them about where they can seek training or support.

As part of the national and State-by-State assessment, a sample of responses would be sufficient. But schools and districts might also wish to use such a form and tailor it to their own special circumstances. Still, a common core of data would be invaluable in monitoring school readiness. Further, with a uniform format the proposed national school entry form would be transferable from one district to another, and become part of the student's permanent school record.

2. A National Health Screening Form

We have made the point on several occasions that prenatal care and good nutrition are closely linked to school readiness. Therefore, in addition to following these national trendlines, we conclude that health data should be gathered from children at the time they enroll in school. Specifically, a national health screening, performed by the school nurse or by a physician's assistant, could provide information about vision, hearing, immunizations, and general physical health, and identify, of course, children with special disabilities. Samples of health screening reports could be selected for national and State-by-State assessment purposes. But if universal, such screening would enable all children with health problems to be referred for further examination.

C. In-School Assessment

This brings us to the third point of readiness assessment. In order to obtain information directly from the children, we recommend a national sampling of kindergarten students every year. We are encouraged to find that creative research is now going on that does provide information about children that can be used in constructive ways to improve preschool experience and enhance learning.

Here, we underscore two essential points:

- First, such information is not to restrict school entry, nor is it to track individual students. If local schools wish to use such data for instructional purposes and teacher guidance, that would be at their discretion.

- Second, the framework used to assess kindergarten children should be based on the five dimensions of school readiness defined above: physical well-being, emotional maturity, social confidence, language richness, and general knowledge.

With these caveats in mind, we propose an in-school assessment process with four interlocking parts. The first involves gathering information directly from the child; the second involves gathering information from parents; the third calls for systematic teacher observations; and the fourth uses a portfolio of the child's work. The proposed assessment would occur at different intervals during the kindergarten year, and teachers would be vitally involved throughout.

1. Child Development Profile

The first step is to secure responses directly from children--but not by using a group-administered test. Rather, the proposed child development profile, given early in the kindergarten year, would use an individually administered instrument, one that could be scored to yield a profile based on the various dimensions of readiness and provide quantifiable data for a national profile, as well as State-by-State comparisons. We caution that it is absolutely essential that valid and reliable measures be used. And while several well-regarded instruments are currently available, more development in this area will be required.

2. Parent Report

The second part of the proposed in-school profile would involve gathering additional information from parents. Such data would go beyond the school entry form, asking selected parents to describe the child's readiness in each of the five dimensions. We remain convinced that parents are a vital source of information, and that they should continue to be involved in the assessment process, even after the child has begun formal education.

3. Teacher Observations

Third, we propose that teacher observations be gathered during the second half of the kindergarten year. Specifically, teachers would record in narrative fashion their observations of student performance--again following the five dimensions of school readiness. This process goes on all the time in a good classroom. However, we propose that it be made more systematic and more uniform, and codified so that the readiness of children can be better understood.

4. *Performance Portfolios*

Fourth, we would include in a proposed readiness profile samples of student work gathered during the second half of the kindergarten year. The portfolio could include drawings and paintings, stories dictated to the teacher, small construction projects, tapes of oral presentations, field trip reports, photographs, and a list from the teacher or parent of the picture books the child has enjoyed. Unlike the blurred "snapshot" of a standardized test, the child's performance portfolio would allow a more qualitative view of school readiness.

VI. A Proposed Calendar

What we propose, then, is a comprehensive assessment grid of school readiness--one extending from prenatal care to the first year of school. And we strongly urge that both indirect and direct data be gathered at three points in time: before school, at the time of school entry, and during school itself.

We recognize that only a few sources of data are available today. This is not surprising, since the commitment to national goals, and the monitoring of those goals, is just emerging. Clearly, time will be needed to create new instruments and enlarge existing data bases in order to have a full profile of national and State-by-State performance. The following table summarizes the full range of our recommendations and the timetable we propose.

SCHOOL READINESS ASSESSMENT

	1991		1995		2000	
	National	State	National	State	National	State
Before-School Data						
Maternal/Child Health Data						
Vital Statistics	X	X	X	X	X	X
National Health Interview Survey	X	0	X	0	X	(X)
Nationwide Food Consumption Survey	X	0	X	0	X	(X)
National Health and Nutrition Examination Survey	0	0	X	0	X	0
Parenting Data						
Vital Statistics	X	X	X	X	X	X
National Household Education Survey	0	0	X	(X)	X	(X)
Supplementary Home Visits	0	0	(X)	0	(X)	0
Preschool Data						
Current Population Survey	X	0	X	(X)	X	(X)

SCHOOL READINESS ASSESSMENT (cont.)

	1991		1995		2000	
	National	State	National	State	National	State
State Counts of Participation in Special Education Programs	X	X	X	X	X	X
Head Start Program Information	X	X	X	X	X	X
New Program Information	0	0	(X)	(X)	(X)	(X)
School Entry Data						
School Registration Form	0	0	(X)	(X)	(X)	(X)
Medical Screening	0	0	(X)	(X)	(X)	(X)
In-School Data						
Child Development Profile	0	0	(X)	(X)	(X)	(X)
Parent Report	0	0	(X)	(X)	(X)	(X)
Teacher Observation	0	0	(X)	(X)	(X)	(X)
Portfolios	0	0	(X)	(X)	(X)	(X)

X = Data Available
(X) = Data to Be Developed
0 = Data Not Available

VII. The Process: Getting There from Here

In moving this proposal forward, there are, we believe, three essential steps.

- First, several important surveys now being used on a limited basis must be expanded so that annual data can be available, nationally as well as State-by-State.
- Second, the most difficult task, designing a new child development profile, will require a special research and development effort involving top scholars, key school administrators, gifted teachers, and committed parents. In shaping this four-part process, extensive and careful work must be done. Further, such research and development efforts must be carried on collaboratively through public and private effort. Finally, we urge that the effort begin at once so that new instruments and procedures can be field tested within 2 years, and made fully operational by 1995.
- Third, this should not be a top-down process. In developing new instruments, it is important to be sensitive to the needs of the various communities concerned with early childhood education, and above all, to be responsive to States and local districts. Not only should state and local representatives--especially teachers--be involved in the design process, they should participate in the field test evaluations. Above all, the States and local districts should be free to extend the instruments, using them to meet their own special needs.

VIII. Conclusion

The commitment by the President and Governors to have all children "start school ready to learn" signals a striking opportunity and an urgent challenge for the Nation. This national goal dramatically underscores the fact that excellence in education begins before school, and even before birth itself. We seek to measure progress toward achieving this objective, not to penalize children who fall short, but to confront the urgent unfinished agenda of serving all students, not just the most advantaged.

Chapter 2
High School Completion

An Interim Report From the Resource Group on School Completion

GOAL 2: **By the year 2000, the high school graduation rate will increase to at least 90 percent.**

Objectives:

- The nation must dramatically reduce its dropout rate, and seventy-five percent of those students who do drop out will successfully complete a high school degree or its equivalent.
- The gap in high school graduation rates between American students from minority backgrounds and their non-minority counterparts will be eliminated.

In early 1991, a Resource Group on School Completion was convened by the Panel to recommend indicators and strategies for measuring progress toward achieving this goal. Members of the group are as follows:

Edmond Gordon	Yale University, New Haven, Connecticut (convener)
Janet Baldwin	GED Testing Service, Washington, D.C.
Eve Bither	Maine Department of Education, Augusta, Maine
José Cardenas	The Intercultural Development Research Association, San Antonio, Texas
Noreen Lopez	Illinois State Board of Education, Springfield, Illinois
Steve Nielson	U.S. West Corp., Seattle, Washington
Aaron Pallas	Michigan State University, East Lansing, Michigan
Rafael Valdivieso	Hispanic Policy Development Project, Washington, D.C.
Richard Wallace	Pittsburgh Public Schools, Pittsburgh, Pennsylvania

The Panel and the Goal 2 Resource Group welcome your reactions to the Interim Report on School Completion.

National Education Goals
Goal Two

High School Completion

I. Statement of Mission

America has long recognized that schooling is central to educating children for their roles as competent, productive adults. Although there are many important educating institutions in our society--including the family, the community, the workplace, and the media--schools hold a special place, so much so that every State in the Union has laws requiring children and youth to attend school. We send our children to school so that they may acquire the skills, knowledge, and values necessary to participate fully in adult work and family life and to exercise the rights and responsibilities of citizens in a democratic state.

Because of the importance that we attach to schooling, it is intolerable that nearly half a million students per year exit grades 10 through 12 without completing their high school program. Our Nation can no longer afford the drain of its resources represented by students leaving school before graduation. Responsibility for this tragedy must be shared by the education system and the society of which it is a part. And solutions must be pursued with unprecedented determination; nothing less than our future as a vital democracy and a vigorous economic force is at stake.

This need appears to be recognized by the Nation's Governors and the President in their commitment to the goal of increasing high school graduation rates to at least 90 percent by the year 2000. Resource Group 2's approach to the charge of recommending indicators and data systems that will monitor progress toward achieving this goal is shaped by four themes emerging from our deliberations: (1) the importance of monitoring educational development at specific benchmarks such as high school completion; (2) the interrelatedness of the National Education Goals and their relation to school reform; (3) the importance of educational equity; and (4) the power of information to enhance educational policy and practice. These four themes frame our approach to National Education Goal 2 and suggest strategies for assessing progress toward its realization. A brief statement of each theme sets the stage for our recommendations.

A. The Current Importance of the High School Completion Benchmark

In spite of our interest in what our children know and learn in school, we have rarely measured these items directly. Instead, we have relied on the presence or absence of credentials such as a high school diploma as a rough guide in assessing whether people possess certain skills, knowledge, and values. We recognize, however, that high school completion is only a crude proxy for assessing what a person has learned in school. We cannot conclude that people who possess these various credentials also possess a specific set of skills, knowledge, and values.

Because of current technical limitations in our abilities to measure directly student achievement and citizenship (i.e., the content of National Education Goal 3), we often rely on high school completion as a rough indicator of such accomplishments, despite its weaknesses in telling us anything of real value about exactly what students have learned. In this sense, National Education Goals 2 and 3 are interrelated, because we implicitly treat measures of progress toward Goal 2 (high school completion) as measures of progress toward Goal 3 (student achievement and citizenship). If direct assessments of the skills and competencies of America's children were available, thereby measuring progress toward Goal 3, the importance of measuring progress toward Goal 2 via the indicator of high school completion might recede. We can envision, in fact, a time when measurement of Goal 2 might be redundant or superfluous because of progress in measuring Goal 3. But for now, it remains extremely important to monitor high school completion rates.

B. The Interrelatedness of the National Education Goals and Their Relation to School Reform

The National Education Goals are interrelated in another fundamental, yet complex, way. Progress toward some of the goals may have consequences for progress toward other goals. Our ability to ensure that all children will start school ready to learn (Goal 1) or that all schools will be free of drugs and violence and will offer a disciplined environment conducive to learning (Goal 6) may influence our success at increasing the high school graduation rate (Goal 2). Conversely, our success in increasing the high school graduation rate has important implications for adult literacy and lifelong learning (Goal 5).

These linkages among the goals have an important implication for assessing progress toward their achievement. Such connections suggest the value of exploring the potential for an integrated indicator system that monitors progress toward all six National Education Goals simultaneously. Our conception of an integrated system extends beyond the collating of different bits of information in an annual report to a reporting system that takes account of the interrelatedness of these goals. For example, we see a need to understand how strategies designed to promote progress on Goal 3 (student achievement and citizenship) have consequences, intended or not, for Goal 2 (high school completion). The converse is true as well.

National Education Goals are also contextually related to the national concern for school reform. Achieving national goals is not likely to be reached without reforming our schools. School reform, in turn, is likely to be powerfully informed by monitoring the progress toward achieving these goals. Thus, we view the process of monitoring achievement of this goal as an initial step, to be followed by the reorganization and restructuring of critical aspects of schooling. Restructuring efforts at all levels of the educational system, from kindergarten to professional teacher preparation, may well be necessary if the Nation is to dramatically increase its graduation rate, prevent children from dropping out of school at an early age, and achieve the other National Education Goals.

C. The Centrality of Educational Equity

Much of the interest in school completion and noncompletion stems from the overwhelming evidence of the different school completion rates of youth of differing racial or ethnic backgrounds. This evidence is explicitly acknowledged in Objective 2 of Goal 2, which states that the gap in high school graduation rates between American students from minority backgrounds and their nonminority counterparts will be eliminated.

The importance of educational equity is clear. We know that different groups of children and youth have differing patterns of school achievement and participation. Some children born into minority and disadvantaged families and communities may be exposed to educational resources that do not prepare them for the curricula that they will encounter in school. In addition, the school processes themselves may deny minority and disadvantaged children access to appropriate educational resources, programs, and teachers. What we see too often are limitations in the readiness of some children to benefit from what schools do traditionally and limitations in the capacities of schools to respond to the needs of some students.

The concern for educational equity reflects the need to reduce the influence of students' social status and material resources on educational achievement and competence as citizens. The goal of public policy in education is to foster achievement among students regardless of race, ethnicity, or language background, thereby eliminating the existing gaps. However, effective public policies depend on valid and reliable measures of relevant factors associated with high school completion for all students. To achieve the goal to increase levels of high school completion among minority and nonminority students, and to eliminate gaps in high school completion rates for these subgroups, high school completion must be broadly defined and accurately reported by race and ethnic group for geographic regions important to the public interest (e.g., the State, the region, and the Nation). Moreover, the factors believed to influence the high school completion rates of different subgroups (such as parental education) must also be measured and their relationships evaluated to identify educational and social interventions that lead to improvements.

D. The Power of Information to Enhance Educational Policy and Practice

As previously noted, the National Education Goals should direct the course of educational reform in this country by providing a lens to evaluate progress toward successful reform and restructuring. We believe that attempts to assess progress toward the goals also send strong signals about what we think is important. For this reason, we have embedded the assessment of progress toward Goal 2 in a comprehensive information system capable of informing educational practice at multiple levels.

We strongly believe in the power of information to help all of us--business leaders, legislators, educators, parents, students, and citizens--to make good decisions about American education and to move the education system toward the needed reforms. Education is a shared responsibility, not limited to the schools, the States, or the Federal Government. At the same time, we recognize the unique responsibility of schools, the most direct providers of educational services and programs to our children and youth. We are, therefore, attempting to fashion a reporting system that will provide useful information about progress toward Goal 2 not only to the President and the Governors, but also to schools and school districts, to help them in their day-to-day work with students to progress toward the goal. Developing such a system may allow educators to use student information more wisely to achieve a better match between students' educational needs and the educational programs and practices to which students are exposed. Thus, the information in such a system can be as useful to school administrators, teachers, and counselors as to Federal and State policymakers. In this way, monitoring national and State progress toward Goal 2 can also facilitate progress toward its achievement.

II. The September 1991 Progress Report

The 1991 Progress Report can provide limited but important baseline information for measuring school completion and dropout rates at both the national and State levels.

A. Data Reported for the Nation as a Whole

1. Recommended Measures

To measure progress toward meeting Goal 2 and its associated objectives, we recommend using the following five national-level indicators in the September 1991 Progress Report:

Indicator #1--The proportion of 19- to 20-year-olds and of 24- to 25[1]-year-olds holding a high school completion credential (data source: Current Population Survey). The Current Population Survey (CPS), conducted by the Bureau of the Census, is the only source of regularly reported valid and reliable national-level data to measure rates of school completion. CPS is a household survey that gathers information from a single adult member of the household about everyone in the household. Since 1967, CPS has been collecting data in a similar fashion on high school completion rates. Completion rates are based on how many complete high school by means of an equivalency certificate as well as how many obtain a regular diploma. (Since 1988, CPS has collected data on the proportion who complete by means of an equivalency certificate of those 24 years old and younger.)

Completion rates can be calculated for age cohorts using CPS data. The use of two age cohorts is recommended so that the phenomenon of rising completion rates after the traditional age of completing high school can be computed. This phenomenon occurs for two reasons: many of those still enrolled in high school at ages 18, 19, or 20 do complete, and many dropouts also complete. Completion rates tend to rise gradually until the late 20's, but the bulk of the increase occurs by age 25.

The choice of the lower age range reflects current enrollment patterns. Most students graduate from high school at age 17 or 18. However, about one-fourth of 18-year-olds are still in high school, and that proportion has been rising over time as children start school later and take longer to complete. The age groups are defined in terms of 2-year age ranges, rather than single years, to be consistent with other recommended measures. (See below.)

Indicator #2--The proportion of 19- to 20-year-olds and of 24- to 25-year-old whites, blacks, and Hispanics holding high school completion credentials (data source: CPS). For the September 1991 Progress Report, the CPS data on completion rates should be calculated for the three largest racial/ethnic categories. These data are available since 1967 for whites and blacks and since 1972 for Hispanics. The sample sizes in the CPS for American Indians/Alaskan Natives and Asians/Pacific Islanders are too small to produce reliable estimates. Furthermore, the sample sizes for blacks and Hispanics are too small to produce precise estimates for single years of age. To address this problem, 2-year age ranges, for example, 19 to 20 and 24 to 25, are recommended.

The data should be displayed as separate, mutually exclusive estimates for the three groups, rather than as differences between the white rates and those for blacks and for Hispanics. The emphasis should be on raising the completion rates for everyone, not just on eliminating differences.

Indicator #3--Event dropout rate for 10th to 12th graders ages 15 to 24 (data source: CPS). An "event" dropout rate is one of three rates for which nationally representative data are available. This rate represents the proportion of students who leave school without completing high school during a single year. We feel this rate is preferable to the other dropout statistic available from the CPS--the "status" rate, which represents the cumulative proportion of an age group who are out of school and have not graduated--because the event rate measures how well schools are presently doing at keeping students in school.[2]

Indicator #4--Cohort dropout rates for 8th to 10th grades (data source: National Education Longitudinal Survey: 1988) and 10th to 12th grades (data source: High School and Beyond). This third type of dropout rate is a cohort rate where a single group of students is followed over time to see what happens to them. The most recent cohort data available are for the 1980 sophomore cohort, which is rather old data. However, data from the National Education Longitudinal Survey: 1988 (NELS:88) will be available by September for 8th to 10th grade dropout rates, which can supplement the data from the High School and Beyond (HS&B) survey for 10th to 12th grade rates in the 1991 Progress Report.[3]

Indicator #5--Either the proportion of dropouts from the sophomore class of 1980 completing high school by 1986 (data source: High School and Beyond) or the number of General Educational Development Testing Service certificates (GED's) issued to 17- to 24-year-olds as a proportion of the number of 17- to 24-year-old dropouts (data source: GED's from American Council on Education and dropouts from CPS). These statistics specifically address the objective that 75 percent of dropouts will eventually become high school completers. To monitor this condition most accurately requires longitudinal data because tracking individuals over time to see what they do is necessary.

Data from HS&B from 1980 to 1986 are available for this purpose, and consideration should be given to reporting these data in the initial Progress Report. An alternative approach that is worth investigating is to take advantage of data collected by the American Council on Education (ACE) about the number of GED's awarded each year by the age of the recipient. The number of GED's awarded to those age 17 to 24 divided by the number of 17- to 24-year-old dropouts (from CPS) could provide an estimate of what percent of dropouts in a single year are receiving GED's.[4]

2. Data Considered But Not Recommended

The only alternative national data sources on school completion rates are those used to calculate the graduation rates in the U.S. Department of Education's Annual State Performance Chart (frequently called the Wall Chart). The rate is defined as the number of high school graduates as a percentage of the number of ninth-graders 4 years earlier, both obtained from the National Center for Education Statistics' (NCES)

Common Core of Data (CCD). There are a variety of limitations to those data, which are discussed at length under State-level measures. Two limitations worthy of special note here are that the data do not include participants in private schools, and are not available by race and ethnicity.

3. *Special Issues: The Publication of Additional Related Statistics*

Race and ethnicity are not a cause of lower graduation rates (or higher dropout rates). Rather, members of racial and ethnic minorities are more likely to be facing circumstances making graduation from high school less likely. Such conditions include poverty, single-parent families, limited English proficiency, and lack of prior success in school. In fact, some research has shown that black-white differences in dropout rates are narrowed or eliminated if such factors are considered. Therefore, members of the Resource Group believe that measuring this objective should be broader than simply focusing on racial and ethnic differences.

Unfortunately, CPS does not contain data related to these other factors. Therefore, we recommend that illustrative data from other sources be used to address this issue and that such data be included in the September 1991 Progress Report. We would specifically like to see data from NCES' HS&B study and NELS:88 used for this purpose. In addition, these longitudinal surveys have large enough sample sizes so that they can be used to produce estimates of school completion and dropout rates for Asians and American Indians. Thus, for these two cohorts, rates can be compared for all five major racial and ethnic groups.

B. State-by-State Reporting

1. *Recommended Data*

We *recommend* that the following three State-level indicators be included in the September 1991 Progress Report:

Indicator #1--State-by-State data on those holding high school completion credentials (data source: CCD). Each year, data are collected by the Federal Government on the number of students completing a secondary school credential in each State's public schools. These data include number of students receiving a regular high school diploma, another type of diploma, a certificate of completion or attendance, or a high school equivalency credential. The data, however, are not entirely comparable because States have policies that affect who is included in each category. In addition, not all States report complete data. These data, however, are usable with certain caveats, and efforts are under way to work with State education agencies to further standardize the reporting of these data.

As previously noted, a school completion rate for each State has been computed in recent years by the U.S. Department of Education, using the count of regular diploma recipients divided by an adjusted number of students who were in the 9th grade 4 years earlier.[5] While this method of computing graduation rates is not universally supported, the resulting rates give the only reasonably standardized current estimate of graduation rates for each State.

We specifically recommend that State completion rates be separately computed and published using the number of students receiving regular diplomas, other types of diplomas, certificates of completion or attendance, and GED's. Together these rates would indicate the proportion of students who remain in school and receive some type of credential or certificate at the end of the expected period of time.

Indicator #2--State-reported graduation data (new State survey). State-by-State public school graduation data are not currently reported for different racial and ethnic groups through any national surveys. It is possible, however, that some States collect graduation statistics for these subgroups. We recommend that States be invited to provide completion data for these categories to the extent they are available and that such data be published in the September 1991 Progress Report.

Indicator #3--State-reported dropout rates (new State survey). State-by-State data are not currently available on a comparable dropout statistic although efforts are under way to collect these data in the next 2 years. For the September 1991 Progress Report, we recommend that States be invited to provide dropout statistics with an explanation of the procedures used to collect and report the data. Some States are known to be collecting statewide data according to the dropout definition and procedures being pilot tested. For these States, baseline data can be obtained for future comparisons.

2. *Special Issues in State Reporting*

It is important to emphasize that the national data in the September 1991 Progress Report will reflect all school completers and dropouts, not just public school students. State-by-State data, on the other hand, can only report on public school students, at least at this time. As a result, care should be taken in comparing the national statistics to the individual State statistics. Nationally, approximately 11 percent of the total student enrollment in 1980 attended private schools. States varied in the percentage of students attending private schools from 1.6 percent to 19.6 percent.

Even comparing one State's graduation rate with another is problematic because of different State policies in granting a high school credential. For example, some States give all students an identical diploma, including students in special education programs who do not complete the same requirements completed by students without disabilities. Others give different types of diplomas, depending on the type of program completed by the students. State policies such as these will have an effect on the number of completers being reported. We, therefore, view the State school completer data to be published in the September 1991 Progress Report as baseline information to chart State progress through the decade.

III. Future Data System Improvements

Our recommendations for improving the national data system to report on progress toward Goal 2 include both interim and long-range objectives. We believe that planning for long-range improvements should begin as soon as possible, because the recommended system involves both technical and sociopolitical considerations that may take several years to resolve. At the same time, we recognize that there are several things that can be done in the interim to improve the quality of current data collections. These interim activities should be pursued simultaneously with the development of the long-range data system.

A. Interim System Improvement Objectives

The interim objectives for the national data system to report on progress toward Goal 2 are short term and incremental in nature, and they may be rightly characterized as "tinkering around the edges." Over the next few years, we envision small but meaningful enhancements to the existing national and State data reporting systems described earlier. The recommended changes can improve the quality of the data gathered without altering the fundamental nature of the data collection and reporting mechanisms currently in place. These interim adjustments are a stopgap measure until the more elaborate long-range data system that we are proposing becomes a reality.

In the short run, the Census Bureau's Current Population Survey and NCES' Common Core of Data will continue to be the data systems of choice for providing national and State counts of high school completers and dropouts.

1. Recommended Interim CPS Improvements

The Resource Group recommends the following four enhancements to the CPS:

Oversampling minorities. Even though the CPS surveys 58,000 households on a monthly basis, the sample includes too few racial and ethnic minority youth to estimate black and Hispanic school completion and dropout rates very accurately. This lack of precision makes it difficult to tell if these rates are actually increasing, declining, or staying constant over time.[6] For this reason, we recommend that the CPS oversample racial and ethnic minority households.

Improving the CPS education items. It is desirable that the CPS items on school attendance and completion conform as closely as possible to the categories used in administrative record systems like the CCD. To date, there still is much ambiguity in the CPS items, which do not distinguish public school completion from private school completion and which are unable to distinguish among several classes of high school completers (for example, those receiving an alternative high school completion credential). While we recognize the importance of maintaining continuity in the established data series, we believe that the need to align our definitions in the national data systems may outweigh the need for continuity.

Assessing the validity of CPS reports. We need better information on the validity of CPS reports of educational attainment for two reasons. First, the CPS relies on household informants to report educational attainment, and we do not know how accurate these proxy reports are. Second, because a stigma is attached to dropping out of school before completion, informants may tend to exaggerate school completion. We recommend that the Bureau of the Census conduct validity studies to assess the agreement of CPS reports with school records of high school completion.

Assessing the undercount. While the CPS is designed to produce national estimates for the civilian noninstitutionalized population, the accuracy of the estimates depends at least partly on the quality of the enumeration of households. If certain types of households are underrepresented in the sampling frame, they will also be underrepresented in the resulting CPS sample itself. Household surveys like the CPS tend to undercount poor and minority households; therefore, both the number of high school noncompleters and the rate of noncompletion for poor and minority youth may be underestimated. We recommend that the Bureau of the Census explore strategies for adjusting CPS estimates of high school completion for the probable undercount of poor and minority youth.

2. *Recommended Improvements to the Common Core of Data*

NCES, in cooperation with the Council of Chief State School Officers (CCSSO), has made great strides in understanding the variability among States in definitions of several key concepts, including who is counted as a high school completer, who is counted as a high school dropout, and who is counted as a student. We strongly recommend that NCES and CCSSO continue their attempts to standardize definitions across States and that they provide technical aid to help States modify their reporting categories.

As previously noted, NCES is currently conducting a feasibility study to determine whether obtaining comparable State-by-State dropout rates through the CCD collection is possible. If the evaluation of this pilot study indicates that States are able to report valid counts of dropouts, we recommend that NCES incorporate dropout counts in the annual CCD collection. NCES should provide technical assistance to those States that request help in gathering such data.

B. Long-Term System Improvement Objectives

Our overall vision for the long-term national data system is rooted in four principles. First, the system must be truly national in scope. A system that is simply the aggregate of independent State or local school district reports would be unable to track students across State or district boundaries. Second, the system must represent the diversity of the American education system and of the existing ways of completing high school. That is, the data system must respect the autonomy of, and be sensitive to, the different ways States and localities define high school completion credentials and the standards for attaining them. Third, the reporting system, like all such systems, must produce information that is technically sound (i.e., timely, reliable, and valid). A system that produces inaccurate or dated information will be of little use to anyone. Fourth, the data system must produce information that can be linked to educational policy and practice for students of all ages. System data should be useful not only at the national and State level but also to local district administrators and school building personnel. Unless potential users of the data system can connect the information produced with possible action steps, the data produced are unlikely to be used.

1. Creating a National Student Data Reporting System

In the long term, we believe that school completion and dropout data should be gathered and reported through a national student-level data reporting system. Such a system would provide more accurate and comprehensive school completion and dropout data than are currently possible. But even more important, we believe that a system of this type would provide education service providers and policymakers at all levels with the vital information needed to both monitor the health of the educational enterprise and tailor student services to individual needs.

Our vision for a national student data base begins at the building level. The systems should place information in the hands of those individuals who can have the most immediate impact on potential dropouts--building-level staff. In addition, school-based information systems can provide information on school completion and school-leaving to the relevant school district and State data reporting systems. In turn, the statewide data reporting systems can provide information to the national data reporting system.

It is easy to see the desirable features of such a system. There is ample evidence that school staff--administrators, teachers, counselors, and others--frequently lack the information on students that they need to make good decisions about matching students to courses, educational programs, and social or health services. In its most generic form, we see the high school dropout problem as the product of the failure to match students appropriately to the educational and social services they need. The information contained in student information systems may help teachers, administrators, counselors, parents, and students themselves to improve the match between students' needs and the services they receive.

In addition to a relatively brief set of "core" data desired for State and national reporting purposes (such as grade level and enrollment status), building-level student information systems might contain a wide range of information, including information on students' current and previous academic performance and behavior, family circumstances, and eligibility for or participation in special programs. These examples, however, are intended to be illustrative only. Because student populations and school programs differ from school to school, building-level school staff may wish to tailor the types of information stored in their student information systems to their distinctive needs. It would, therefore, be inappropriate for us to prescribe the relevant information.

Another key advantage of building-level student information systems is that these systems provide an early warning system for detecting potential dropouts. Schools that are able to identify a set of factors reliably associated with the risk of dropping out of school may be able to allocate or reallocate resources to decrease the potential risk of leaving school before completion.

It is important that our recommendation be clear about exactly what kind of information building-level data might be forwarded to the State and national levels. We are not proposing a national data system with detailed information about the performance and characteristics of individual students. Such a system would raise more questions than it would answer. Rather, we are proposing that information at the building level be abstracted for use in statewide information systems and that information at the State level be abstracted for use in a national data reporting system. The national and State data reporting system should not contain any specific information about individual children and youth.

We concluded that monitoring student progress over time and across school district and State boundaries would be helped by the use of unique, standardized student identifiers across the Nation. We recommend that NCES convene a task force to consider developing a national system of student identification numbers, perhaps based on students' Social Security numbers.

2. *Steps in Implementing a National Student Data System*

We harbor few illusions about the speed at which school-based information systems can be implemented. In many respects, the technical aspects of system design and implementation are much more tractable than the social and political aspects. There already are projects across the Nation that are attempting to implement school-based information systems at the local district and building level. Many of these projects are housed in the Nation's largest public school systems. We hope that the Nation can draw on the expertise and experiences of these projects in the planning and implementation of a nationwide data reporting system.

We recommend the following steps toward developing a fully functional nationwide student information system:

- First, the NCES, in conjunction with other organizations such as the Council of Chief State School Officers and the Council of Great City Schools, should work with a small number of States and districts to develop a set of model student information systems. This activity would provide a set of alternative models appropriate for States and districts with varying needs and resources.

- Second, NCES should examine strategies for linking school-based student information systems to statewide systems and for linking information from statewide systems to a national reporting system. Such strategies might include developing "crosswalks" that enable the transfer of data from one system to another, planning and developing a network of electronic data transfers, developing procedures for maintaining data security and auditing the data, and developing a governance structure or structures to support a national data reporting system. These activities might be coordinated with the proposed NCES Interstate Student Records Transfer Project, which has a similar agenda.

- Third, NCES should recommend a flexible model or models for statewide and school-based student information systems and provide technical assistance to States and local school districts in the design and implementation of such information systems.[7]

We estimate that the process of developing a fully functioning national student data system suitable for State-, district-, and school-level adoption will take approximately 5 years.

3. *Special Considerations*

a. State Participation. To be wholly successful, the system that we are proposing requires the active participation of all of the States. We recognize, however, that in periods of declining resources, States must make difficult tradeoffs between investing in programs and investing in information systems. Not all States may have the resources to implement statewide student information systems soon. Developing such systems, however, may be deemed so crucial that an enhanced Federal role will be required. Specifically, the Federal Government may wish to consider cost-sharing arrangements that partially subsidize State efforts to establish student record systems. Further, adopting compatible systems among the States could be gradual. States can "buy into" this system as they develop the relevant resources (including potential Federal support), in much the same way that they currently "buy into" the NELS:88 data collections.

b. Need for Continued CPS Collection. The recommended national student data system is based on the reports of public school enrollments, graduates, and dropouts. The system will not provide data on the educational attainments of children and youth enrolled in the Nation's private schools. Since approximately one child in ten is enrolled in a private school, this is a limitation. As noted earlier, the CPS could be modified to produce some relevant data on school completion and dropout rates in both public and private schools.

c. Need for Enhanced Research and Analysis Capabilities. Even when fully operational, a national student data system is a cumbersome instrument for basic research on the "causes" of dropping out and the effectiveness of policies designed to enable a greater number of students to be successful in school. Controlled longitudinal sample surveys such as the NELS:88 are the best vehicles for investigating questions such as these. Unfortunately, the 8-year gap between these studies is uncomfortably long. Especially if there is good reason to believe that rates of school-leaving and factors that affect them may be changing over relatively short periods (a reasonable assumption in this era of heavy State policy reform), accelerated longitudinal survey cycles--perhaps every 2 to 4 years--should be considered.[8]

d. Tracking School-Leavers. The proposed data system relies on school record systems for data, rather than on the reports of individuals or other agencies. The integrity of this system, therefore, depends on the ability of school-based record systems to track students once they have left a particular jurisdiction. This ability is a longstanding concern regarding the reliability and validity of administrative data on school-leavers, but we believe that considerable progress has been made in accounting for such school-leavers.

e. Data Burden. We are concerned about the potential for "data burden"--the extent to which the activities needed to produce the data required by our proposed reporting system become a burden on school staff who must provide such information. There is a danger that those who are charged with providing or processing such information will simply have this responsibility added to their existing responsibilities, without concern for the additional hardships placed on them. School staff must make judgments balancing the importance of information with the costs that providing information places on the providers. Reallocating resources to meet the data needs for the information system may be necessary.

The burden on school and administrative staff to aggregate, analyze, and report on indicators such as school completion and dropout rates may be eased if they were to report on 2- to 3-year rather than annual cycles. The frequency of reports from student record systems (or from other data sources for that matter) should be related to how quickly the phenomenon being measured is thought to change. Historically, annual changes in dropout and completion rates have been quite small, with trends only becoming apparent over several years. Therefore, as a rule, less frequent data aggregations and analyses may ease data burdens while still meeting the needs of administrators and policymakers.

f. An Early Warning Data System. We believe that collecting direct evidence on school completion and noncompletion is not the only appropriate strategy for gauging progress toward the realization of Goal 2. We particularly recommend developing "early warning" indicators that predict the likelihood of not completing high school. If, for example, being substantially overage for one's grade or being retained in grade were widely recognized as correlates of school noncompletion, then measures of this phenomenon at one time could indicate likely outcomes at some later time, barring any intervening changes. Trends over time in these early warning indicators might then provide evidence on subsequent progress toward achieving Goal 2. While recognizing the complexity of this chore, we believe that there is a sufficient body of national evidence on the causes and consequences of school completion and dropouts to begin such a discussion.

IV. Summary

In specifying the National Education Goals, the President and the Governors have acknowledged the need to organize our efforts to reform the education system and monitor its well-being. The goals and our attempts to measure progress toward them can provide such a focus, framing the actions of State and Federal policymakers as they seek to improve education.

But public education in the United States is shaped at many levels, from the schoolhouse, to the statehouse, to the White House. We should not overlook the opportunity to allow the National Education Goals and the indicators associated with them to affect the actions of individuals at all levels of the education system. Therefore, we have proposed the development of a national student data system that will provide feedback to those charged with improving education at the local as well as State and national levels.

The combination of existing data systems and our proposed national student data system will provide a powerful tool for assessing the Nation's progress toward Goal 2--increasing the high school completion rate. In the short run, the current data systems, with the modifications we recommend, will document the current status of, and future trends in, school completion rates at the national and State levels. In the long run, the proposed national student data system holds the promise of generating even more useful information that might speed progress toward Goal 2.

Endnotes

1. The specific age ranges and grade levels recommended for reporting on this and other indicators represent preliminary judgments of the Resource Group. We recommend that further technical planning work be undertaken before these determinations are finalized.

2. The event rate is also preferable for purposes of comparisons with State and local administrative record data. Because schools typically calculate event rates, a published national "event" dropout statistic can be most readily compared with similar data collected locally.

3. Data from NELS for 12th graders will become available in 1993 and should be reported in that year's Progress Report.

4. Unfortunately, such data do not provide an estimate of what percent of dropouts ever finish by way of a GED nor do they reflect dropouts who complete by any means other than a GED--either by obtaining a regular diploma (HS&B suggests one-third of dropout-completers receive a regular diploma) or some other type of equivalency certificate (very few).

5. Adjustments are made for ungraded students and for interstate migration patterns.

6. For example, while the Bureau of the Census estimates the event dropout rate among Hispanics to be 7.9 percent in 1989, because of the small sample size, there is approximately one chance in three that the true value is less than 6.6 percent or greater than 9.2 percent, a relatively broad range of values.

7. We have tentatively identified NCES as the primary sponsor of most of these activities, although other agencies might take the lead as well. While the development of local and statewide information systems is wholly consistent with NCES' mission, the recommended design, implementation, and technical assistance efforts would represent a substantial expansion of the agency's responsibilities, requiring additional resources.

8. These more frequent studies need not contain the same volume of information as those on the 8-year cycle. There may be acceptable tradeoffs between the frequency of data collection and the scope of the data collected.

Chapter 3
Student Achievement and Citizenship

An Interim Report From the Resource Group on
Student Achievement and Citizenship

GOAL 3: **By the year 2000, American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy.**

Objectives:

- The academic performance of elementary and secondary students will increase significantly in every quartile, and the distribution of minority students in each level will more closely reflect the student population as a whole.

- The percentage of students who demonstrate the ability to reason, solve problems, apply knowledge, and write and communicate effectively will increase substantially.

- All students will be involved in activities that promote and demonstrate good citizenship, community service, and personal responsibility.

- The percentage of students who are competent in more than one language will substantially increase.

- All students will be knowledgeable about the diverse cultural heritage of this nation and about the world community.

In early 1991, a Resource Group on Student Achievement was convened by the Panel to recommend indicators and strategies for measuring progress toward achieving this goal. Members of the group are as follows:

Lauren Resnick	University of Pittsburgh, Pittsburgh, Pennsylvania (convener)
Gordon Ambach	Council of Chief State School Officers, Washington, D.C.
Chester E. Finn, Jr.	Vanderbilt University Educational Excellence Network, Washington, D.C.
Asa Hilliard	Georgia State University, Atlanta, Georgia
David Hornbeck	Independent Education Consultant, Baltimore, Maryland
Richard P. Mills	Vermont State Department of Education, Montpelier, Vermont
Thomas W. Payzant	San Diego City Schools, San Diego, California
Claire Pelton	San Jose Unified School District, San Jose, California
Terry K. Peterson	South Carolina Business Education Committee, Columbia, South Carolina
Marshall S. Smith	Stanford University, Stanford, California

The Panel and Goal 3 Resource Group welcome your reactions to the Interim Report on Student Achievement.

National Education Goals
Goal Three

Student Achievement and Citizenship

I. Introduction

This is a report on the work of the Resource Group for Goal 3 of the National Goals for Education. The Resource Group has met twice and conducted several telephone conferences during January and February 1991. In developing these recommendations, we consulted with a number of people with specialized expertise relevant to our charge. What follows represents the consensus of the Resource Group members.

II. The 1991 Progress Report

The annual Progress Report should be viewed as a tool for generating discussion of and attention to educational achievement goals at every level of the American public, in States and localities as well as in national forums. To this end, we suggest a report card format in which information is presented in simple and understandable terms. Technical material should be included in appendices and briefing documents, not in the main Progress Report. The report card format should highlight trendlines and changes over time.

Options for the September 1991 Progress Report are limited. There are little data available that indicate directly what students know and can do. Nevertheless, a sensible and informative report card is possible using existing data along with information from an opinion poll that could be conducted between now and September.

A. National Reporting

1. Recommended Measures

We *recommend* inclusion of the following data at the national level in the September 1991 Progress Report:

a. Achievement Scores from the National Assessment of Educational Progress [data source, National Center for Education Statistics (NCES)]. The National Assessment of Educational Progress (NAEP) provides the Nation's best currently available data on student achievement. It has tracked school achievement since the 1970's in math, reading, science, and writing and has conducted occasional assessments in other subject matters, including literature, citizenship, history, the arts, geography, and computer competence. For the subjects that have been tested repeatedly, a report can be constructed that makes changes and lack of them (mostly the latter) visible and easy to understand. The Progress Report can be broken down by quartiles (it will show small but steady rises in some subjects for the bottom quarter of students, no changes from generally low levels of performance for all others); by race and ethnicity (it will show gradual rises among minorities for several subjects); by gender; and by public vs. private schools.

By September it may be possible to report the 1990 mathematics assessment in terms of percentages of students meeting the new levels of proficiency (basic, proficient, and advanced) that the National Assessment Governing Board (NAGB) is trying to define. Serious technical problems have been encountered in setting these levels. If these problems can be resolved in time, we recommend reporting percentages of students at each level along with, not as a substitute for, the trendline data just described. It will not be possible to report previous years' data in terms of the new standards, so no direct comparisons of these standards with those of past years will be possible. If proficiency levels cannot be reported this year, we recommend continued technical work so that they can be used in subsequent years. The use of the new proficiency levels for reporting can provide a major point of focus for national discussion and for target-setting for improvements in achievement.

b. Number of Advanced Placement (AP) Tests Given and Test Scores Earned (data source, The College Board). AP tests are examinations given to students who take special preparatory courses. They are instructionally relevant examinations of high quality. Many colleges offer advanced placement credit to students on the basis of AP test scores. Although only a small percentage of students currently take AP courses and examinations, the percentage has been growing. An index based on how many tests are given, how many are passed, and how many students take at least one test can provide a good indication of the extent to which high schools are offering and students are opting for challenging academic instruction. Breakdowns by ethnicity and race, gender, and public and private schools are possible.

c. High School Course Enrollments (likely data source, NCES). Enrollments in certain high school courses measure the extent to which students have the opportunity to learn important subject matter. Enrollments are also a good indirect measure of the quality of academic preparation and motivation in middle schools. National data, based on detailed analyses of samples of high school transcripts, are available for 1982 and 1987. There were some changes in enrollment patterns during that period, apparently in response to education reform efforts of the first half of the decade. If the 1991 Progress Report includes information on these two dates, a baseline for comparison with selected years in the 1990's will be established.

We recommend reporting rates of enrollments in advanced mathematics and science courses. Lower-level courses are generally required of everyone, so enrollment rates are not useful indicators.

We also recommend reporting on rates of enrollment in second- and, especially, third-year foreign language courses.

We recommend reporting on the percentage of students who, in 1982 and 1987, took the "new basics" series of courses recommended by the 1983 National Commission on Educational Excellence, if such an index can be constructed.

Finally, we recommend, if possible, reporting on the number of students who have studied algebra by the end of 8th grade. In addition to indicating how much math a student has learned through the 7th grade, this report is an important "gatekeeper" indicator. Students who do not take algebra by 8th grade have little chance of completing a high school course that includes calculus, yet many middle schools do not currently offer algebra in 8th grade.

d. *International Student Achievement Comparisons [likely data source, International Evaluation of Educational Achievement (IEA)].* We believe that appropriate international comparison data in as many subjects as possible are essential. The Resource Group for Goal 4 is investigating sources of comparative data for mathematics and science. International comparison studies by IEA are being developed in mathematics, science, reading, computer literacy, and early childhood education. Several of our recommendations call for deliberate efforts to benchmark educational standards against those of other nations.

e. *National Poll on Satisfaction of the Education System's Clients.* These are the only kind of new data that could be made available for September 1991. We recommend considering a poll of clients of the education system (employers, postsecondary educational institutions, parents, and students several years after leaving school). Such a poll, repeated annually or biannually, would help to track changes in satisfaction with educational achievement over the decade.

2. *Rejected Measures*

We *recommend against* use of the following measures at the national level in the September 1991 Progress Report:

a. *SAT and ACT Tests.* Because so little good data are available for tracking achievement in American schools, these college entrance tests are often used for comparing States or schools. We recommend against continuing this practice. Each of these tests is taken only by college-bound students in certain States. This limitation makes for a variable and nonrepresentative sample. More important, the tests do not directly measure what is taught in schools. They are, therefore, not good measures of school achievement.

b. *College Board Achievement Tests.* These tests more directly represent high school course content than either the SAT or ACT. However, they are not widely used at this time, so they will not provide a very reliable sample of school achievement.

c. *International Baccalaureate.* This high-standard examination works to an international standard. It is tied to course content, and students actively study for the exam. However, since only 2,000 to 3,000 American students take this exam each year, it will not provide a useful indicator for the Progress Report.

d. *Military Screening Exams.* Military screening tests (AFQT and ASVAB) are taken by many American youth, sometimes in their high schools. We recommend against using these tests in the Progress Report for the same reasons that we do not like the use of SAT and ACT for this purpose. A variable and limited population takes the AFQT and ASVAB, and they are not tied directly to any instructional program.

3. Data Alternatives and Unresolved Issues

a. *Citizenship, Community Service, and Personal Responsibility.* We have not yet been able to find reliable indicators of the extent to which this objective is being met.

b. *Knowledge of Diverse Cultural Heritage and World Community.* We have not yet been able to find reliable indicators of this objective.

B. State-by-State Reporting

Data available for State-by-State comparisons are even more limited than for the Nation as a whole. We considered both data that would be comparable across States and a possible collection of State self-reports that are not completely standardized. The State-by-State 1991 Progress Report that we are recommending will not be rich. However, we think that it would be better to invest in building an excellent end-of-decade system than to attempt to create indices based on the current data.

1. Recommended Measures

We *recommend* including the following data at the State level in the September 1991 Progress Report:

a. *NAEP State-by-State Data.* In 1990, 37 States participated in a trial use of NAEP for State-by-State comparison in eighth-grade mathematics. The quality of the experiment is currently being evaluated by a National Academy of Sciences panel. Assuming a favorable evaluation and successful resolution of the problems related to the proposed NAGB levels of proficiency, we recommend reporting these data. We note that the interest of this data will be primarily to establish initial reference points for future trendline data and to establish expectations for future State-by-State NAEP reporting.

b. *Advanced Placement Tests.* State-by-State data are available on who takes AP tests and their scores. These data should be included in the 1991 Progress Report.

c. *Course Enrollments.* Course enrollment data paralleling the national data should be reported for the States.

d. *Individual State Reports.* Because comparable State-by-State data for 1991 will necessarily be sparse, we suggest the possibility of inviting each State to contribute a brief report on the State's system of monitoring school achievement results, related to some self-chosen reform effort. The intent of this latter invitation is to give each State a chance to report on some positive activities in the State and to highlight systemic reform efforts. If individual State reports are invited, considerable thought will need to be given to designing the common questions and the forms of presentation. (See Section IV.B. for some possible questions.)

2. *Rejected Measures*

We considered, but *recommend against,* the following additional possibilities:

a. *Norm-referenced Achievement Tests.* These are used by many States as part of their state assessment programs. However, different tests are used by different States. The "grade-level" reporting used does not necessarily imply a common achievement standard because the tests have not been equated to one another. Furthermore, the tests have been designed to compare students, not to measure how well they do against a planned achievement standard. Thus, they invite "Lake Wobegon" reporting (all States above average) and provide no means of informing the public as to what substantive competencies are represented by different scores.

b. *SAT, ACT, College Board Achievement Tests, AFQT, International Baccalaureate.* We recommend against the use of these tests at the State level for the same reasons that we recommended against including them in the national report.

III. Future Progress Reports: Long-Term Data System Design

The panel's major task is to lay out a strategy for long-term assessment of achievement outcomes. As one can see from the foregoing recommendations for the 1991 Progress Report, there is a paucity of decent outcome data presently available. We recommend the development of a nationwide assessment system based on world-class standards that can ultimately be used to transform American education.

A. The End-of-Decade Nationwide Assessment System

1. Rationale and General Approach

Observations of examining practice in America's competitor nations show that several different structures are possible for a national examination system. Some countries use a single examination for all students, although exam grading is usually conducted locally or regionally. Other countries have developed systems in which several different authorities administer their own exams. The countries have a variety of methods for ensuring that exams and grades are based on an equivalent standard. Apparently, some degree of decentralization has been helpful in keeping educators informed of and invested in the examination process and in promoting innovation in examination procedures. Such investment is the key to the effectiveness of an examining system in creating and maintaining high educational standards.

Recognizing the desirability of some degree of decentralization in an examination system for a country as large and diverse as ours, the panel has been discussing a "cluster" model for a nationwide assessment system. In this model, States or clusters of States would develop shared curriculum frameworks and exams. The cluster exams would be calibrated to a national standard. A full assessment system would include both program assessments, designed to monitor the overall effectiveness of the education system, and individual student assessments, designed to motivate student and teacher efforts to a high level of academic achievement. Both assessments should reflect the same national goals for educational achievement and should, therefore, be based on a carefully developed national educational standards framework.

2. Building the System

In order to create this proposed national assessment system, three major tasks must be successfully accomplished. First, a national educational standards framework must be developed. Second, when the framework is completed, it must serve as the basis for designing a set of national anchor examinations. Third, criteria must be created for evaluating student performance on the anchor exams.

a. *Creating a National Educational Standards Framework.* One of the panel's most vital tasks is to initiate discussion of and make recommendations to the Governors, the President, and the Congress on an appropriate process for creating a national educational standards framework. The standard-setting process itself, if carried out in a broadly consultative manner, can be part of the educational renewal sought by the panel, producing greater interest in and commitment to educational achievement among all citizens. To establish a national education standards framework will require appropriate authorization of a nationwide entity to provide leadership for the task. For purposes of illustrating the type of entity and the role for such a body, the following description of a hypothetical "Board" is provided. Such a board would establish procedures for a process of standards setting designed to engage Americans of all social groups and in all parts of the Nation in a substantive consideration of what they want young people to know and be able to do as a result of their schooling years. The board itself should broadly represent the various constituencies with an interest in education--parents, business and labor, policymakers, educators, community advocates, and curriculum associations.

There are several different ways in which a consultative standard-setting process could be conducted. For example, the process could begin in the States, with each State conducting discussions among its citizens of educational goals and standards and deciding on its own set of achievement objectives. The national board could then be responsible for identifying the common elements in the different clusters' objectives. These common elements could become the basis for a national standards framework. Alternatively, the process could begin with the board proposing knowledge and skill objectives for consideration by the States. Neither of these options in its pure form seems likely to produce a high-quality national standard toward which schools throughout the country could work. The first, the begin-in-the-States approach, might produce such differences in language and substance that it would be difficult to find enough commonality for the national standard. Furthermore, it would deny to individual States or clusters, the guidance of the substantial work on defining educational goals and objectives that has been done by national curriculum associations and other groups. The second, the begin-at-the-center approach, is likely to produce resistance rather than willing adoption by States and local school districts. We think a mixed strategy in which discussion moves back and forth between the central board and the States several times is most likely to be effective. The process might work something like this:

1. First, the board would collect and make available to States the curriculum standards or guidelines that have been produced by various national curriculum study groups in the nation [e.g., the National Council for Teachers of Mathematics (NCTM) for mathematics, the American Association for the Advancement of Science (AAAS) for science and technology, and the Bradley

Commission for history], along with current State curriculum frameworks and, perhaps, curriculum frameworks from several other countries. States would set up procedures for review and comment on these frameworks by groups of educators and citizens, preferably at the level of local schools or districts. The proposed frameworks would be used to stimulate and guide discussion. All segments of the population interested in education--parents, teachers and other educators, employers, and community advocacy groups--would be invited to participate in this process.

2. Based on these discussions, each State would compile a report on the interests and preferences of its citizens with respect to educational content and skills. These reports would be returned to the national board and might also be widely circulated within the State. We recognize that many States have already conducted consultations of this kind. Such States might wish to submit their existing frameworks rather than conducting a new consultative process, or they might wish to use the opportunity to compare their own frameworks with those offered by the board.

3. Next, on the basis of the State reports, the board would prepare a draft proposal for national knowledge and skill objectives. Representatives from all education constituencies would participate at the national level, as they had in the individual States or clusters. This draft would be returned to the States, which would arrange for review by citizen groups, as in the preceding step.

4. Finally, the board would revise the draft, thus creating a detailed set of knowledge and skill objectives for the Nation. This draft would be offered to States and clusters for adoption.

b. *Putting the Standards to Work: National Anchor Examinations.* Although the cluster concept of a nationwide assessment system leaves authority for selecting and administering examinations to the States, some method is needed to ensure that the different examinations are in fact meeting the same standard. The most likely way of doing this in the United States is to create a set of national anchor exams in various discipline and skill areas. These examinations would directly reflect the national standards. They would provide a calibration standard against which the cluster exams could be evaluated. Technical work on calibration procedures is under way in several projects. This recommendation assumes that appropriate calibration procedures can be developed. It might also be possible to permit States or clusters to administer the anchor exams directly to their students.

The fundamental reason for introducing a system in which individual students are examined is the belief that such examinations can provide focused targets for study and instruction, thus raising achievement levels in the Nation. To serve this purpose, examinations must function as an integral part of the educational system, capable of setting a clear standard toward which students and teachers can work. This goal dictates the kinds of assessments that will be needed. They must be assessments focused on high levels of achievement (thinking and reasoning, not routinized skills), assessments tied to curriculum goals or frameworks, assessments designed to be studied for and taught to. No broad assessment system that meets all three of these criteria and is designed for our entire school population is available today. Building such systems will require substantial effort and resources over the decade. As for initial standard setting, we think an iterative process, in which states and the national board work together, will produce the best results. Here is a possible process:

The national standards framework is a necessary first step in defining educational standards. However, descriptions alone cannot fully define or communicate the kinds of skills and knowledge that are intended. To understand the skill and knowledge goals, educators, parents, and other groups of citizens will need examples of the kinds of performances that will be taken as evidence that students have met the objectives. Developing these examples will also serve as a first step in creating performance assessments for the objectives.

The first stage in developing examples would be to collect and generate appropriate performance tasks for the various achievement objectives. This stage could be initiated by the States and clusters or by the board. If the States take the lead, more individuals would be involved, producing a richer array of candidate tasks. States' work on generating assessment tasks could serve simultaneously as part of the process of establishing cluster exams. The national board could stimulate the process by providing examples of tasks (including some borrowed from other countries) and technical assistance, but the board would not attempt to impose details of a process or point of view.

The next stage consists of selecting those tasks that will define the national standard. At this point, the board would need to take the lead, again in a broadly representative process.

c. Setting Grading Criteria. The process of setting standards is not really complete until criteria have been set for grading performances on the defining, anchor exam tasks. The national board's responsibility is to assure that any performances included in the anchor exam be judged with acceptable degrees of reliability. This task would require actually administering the anchor examinations and conducting grading exercises. The ultimate product would be both a reliable anchor examination to be used as a calibration standard and a means of communicating to the Nation what our national educational standards are.

3. *Major Issues and Alternatives in the Long-Term National Assessment System*

a. The Continuation of NAEP. The Nation needs an independent education monitoring system, at least until the new individual student examination system is being developed. NAEP can continue to play this role, but only if NAEP is not turned into a "high stakes" test that students are trained to pass. Maintained as an independent indicator test, NAEP can provide an important "audit" function on the new assessment system as it is developed.

Therefore, we recommend that NAEP be maintained in its current, matrix sampling form, at least until the new assessment system is in place and well accepted. At that time, possibilities for merging NAEP and the new system can be considered. Consideration should be given--as the National Governors' Association has recommended--to authorizing states and local authorities to use the NAEP tests, to the extent this can be done reliably within the matrix sampling system. In future years, NAEP tests should be constructed on the basis of the new national standards, but the tests should also be designed to permit trendlines and comparisons with past years.

We further recommend investigating ways of calibrating NAEP to international examinations or to the examinations of other countries. In this way, NAEP could serve as an instrument for monitoring America's progress with respect to other nations.

b. Examinations in Foreign Languages. High immigration rates require that explicit attention be given to the question of how to include children of limited English proficiency in a system of nationwide assessment. We assume that all American children will be expected to learn English thoroughly. We therefore recommend that all children be examined in communication skills--oral and written--in English. Information on the number of years that nonnative-born children have been in the United States should be collected and used in interpreting the success of schools in meeting communication skill standards.

At the same time, the native language skills of immigrant children constitute a potential resource to the nation; such children will more easily than others be able to meet the objective of showing competence in two languages. There is evidence that unless schools show overt evidence of valuing native languages, many children will refuse to continue using them. We therefore recommend that children's communication competencies be assessed in two languages, beginning in elementary school. We expect that this practice will encourage earlier and more intensive foreign language instruction for native English speakers and will preserve native language capacity among immigrant children.

In subjects other than language, (math, science, etc.) testing in English can mask real competencies. To avoid this problem and present a true picture of achievement levels, consideration might be given to testing these subjects in the child's language of instruction.

IV. An Interim Reporting System

The new assessment system that we have recommended may take most of the decade to put into place in its entirety. In the interim, a reporting system can be maintained that includes all of the elements recommended for the 1991 Progress Report along with expanded data from NAEP. The Progress Report during the interim years should also include reports from the States on progress related to systemic educational improvement.

A. NAEP Expansion

NAEP would provide a more complete monitoring system if it included regular, periodic (perhaps every 2 years) testing in all major subjects (a basic list would include mathematics, science, English, history, and geography; a more extended list might add literature, social sciences, and the arts) at 4th, 8th, and 12th grades. NAEP results should be reported for individual States and perhaps school districts. (See our earlier recommendation.) We note that State-level reporting after 1992 will require congressional action. Furthermore, even if technical difficulties in reporting proficiency levels cannot be solved by this fall, we strongly urge that appropriate work be done to permit such reporting in subsequent years. This form of reporting would allow States and the Nation to set meaningful targets for improvement in achievement levels.

B. Collection of Data on Systemic State Reforms

In its 1990 report, "Educating America: State Strategies for Achieving the National Education Goals," the Task Force on Education of the National Governors' Association (NGA) called for radical changes in the structure and functioning of State and local education systems. The Task Force outlined a set of systemic reform strategies to effect the changes described as necessary. These strategies are designed to help motivate the Nation, the States, communities, and schools to restructure the practice of education sufficiently that our students will know and be able to do those things that will permit them to be effective citizens and productive workers. The development of new assessment tools was put forward as a top priority in effecting change in this country's education system. The report recognized that an examination system based on world-class standards is a key element in a plan for revitalizing American public education, but also that an examination system alone is not enough. Each State must also initiate a systemic strategy aimed at ensuring that all students in the State be given the maximum opportunity to succeed.

We recommend that the interim 1991 Progress Report include information collected from each State that will indicate the State's progress toward systemic education reform. The reform strategies outlined in "Educating America" are echoed in a number of reports and policy positions. A consensus appears to be emerging as to what components of a model of change are most likely to significantly increase student achievement by all children. The following are examples of the kinds of indicators of a strong systemic change strategy that might be included in the 1991 Progress Report:

- Has the State taken actions that demonstrate the conviction that all children can learn? Such actions could include antitracking initiatives, increased proportions of disabled students being successfully educated in regular classrooms, and data demonstrating that the achievement gaps between ethnic and gender groups are narrowing.

- Has the State adopted student achievement goals and targets that reflect high expectations in the disciplines and qualities, such as problem solving, critical thinking and integration of knowledge that cuts across the disciplines? If not, has the State initiated a participatory process within the State that will lead to the establishment of such goals and targets and their acceptance by parents, educators, and citizens?

- Has the State developed curriculum frameworks that embody the outcome achievement targets in at least the curriculum areas of national Goals 3 and 4?

- Has the State identified and/or embarked on developing assessment strategies that are as rich as the outcomes that they wish all their children to achieve? Do the assessment strategies reflect the achievement goals and targets established in the curriculum frameworks?

- Has the State developed a system of accountability that provides powerful rewards to schools and school staffs when students succeed in meeting target outcomes or are moving satisfactorily toward meeting them? Does the accountability system provide aggressive assistance of a variety of kinds to unsuccessful schools and school staffs and significant corrective action in the face of persistent failure?

- Has the State established a strategy for teacher professional development that ensures that all teachers are well prepared to teach effectively the content necessary for students to succeed on the achievement examinations? Have the State and local systems developed a strategy to ensure that all continuing teachers are prepared to teach the material in the achievement content frameworks?

- Has the State created a structure within which teachers and other local school professionals are given the freedom and responsibility to best figure out how to achieve the goals and targets established at the State level? Has the State strategy created a context in which decisionmaking power is moved down the bureaucratic pipeline in a manner that aligns accountability and control of instructionally related decisions?

- Is the State systemic strategy in all of its components designed to place a premium on the achievement of minority, poor, limited-English-proficient, disabled students and any others with whom schools fail in disproportionate numbers?
- Does the State provide a quality, developmentally appropriate prekindergarten program for at least its low-income 4 year olds?
- Has the State developed a coordinated system through which the health and social service barriers to student achievement are being reduced?
- What evidence is there that the state sees the elements of its change strategy as integrated or systemic? Are the parts of the system aligned with one another? For example, is teacher training directed at the curriculum framework? Is the reward, technical assistance, and penalty system related to the outcomes? Will the assessment system measure the outcomes?

If a State has defined a fundamentally different systemic State reform strategy, the opportunity should be provided for the State to describe its elements.

We recommend that information be collected annually on these items. In addition, we recommend that a system be established whereby an independent and diverse citizens' group in each State examine the evidence behind the answers to these questions every other year to ensure that the process is not simply a checklist effort lacking depth and quality.

V. Tasks, Schedules, and Timetables for Implementing Interim and Long-Term National Assessment Systems

A. Grade Levels and Subject Matter for the Anchor Examinations

The National Goals for Education call for American students leaving grades 4, 8, and 12 to demonstrate high levels of competency in school subject matters. These three points of achievement measurement reflect NAEP score availability. We assume that NAEP will continue to report at these grade levels. However, a different pattern of examination milestones might be more aptly incorporated into the examination portion of a nationwide assessment system designed to motivate and organize studying and teaching to a high standard.

Careful thought and considerable consultation will be needed to select two or three key points in the grades kindergarten through 12 school cycle for examination. Points of examining should be related to points of transition or decisionmaking in a student's career and should permit school staffs to organize coherent, multiyear educational programs preparing students for the examinations. Particularly for secondary students, consideration should be given to permitting students to accumulate examination credits over several years rather than sitting for a single pass–or–fail test. This method could accommodate different rates of learning, yet hold all students to a high standard of achievement. We believe that decisions on timing of examinations will best be made by the board, building on information gathered during the process of establishing the educational standards framework. However, the Resource Group could, if requested, provide an analysis of the issues and choices the board should consider.

B. Timelines and Costs for Development of the Nationwide Assessment System.

Our Resource Group recognizes the urgency of putting the new assessment system in place as quickly as possible as part of a national move toward excellence in education. We have outlined a three–step plan of action, beginning with development of a national educational standards framework that can then serve as a basis for designing a set of national anchor examinations and grading standards.

There are several possibilities for organizing the framework and standard–setting process. Each has advantages and disadvantages, with inherent implications for the schedule on which the examination system could come into use. We estimate that once agreement on the standards framework for a given subject has been reached, it will require 2 or 3 years to develop and validate an anchor examination. This requirement means that if the process of creating the standards framework were to begin this year, the first examinations could be ready for use by mid–decade. Additional examinations, for a more extensive system, could be phased in over the remainder of the decade. The Resource Group is ready, at the panel's request, to develop alternatives and recommendations for expediting this process of exam development.

There are two parts to the cost projection question. The first is the cost of developing the system and initially putting it in place. These estimates need to be developed in conjunction with establishing a process and timelines. The second is the operating cost for the kind of examination system we recommend once it is up and running. There are objections that the kind of assessment our recommendations call for will be impossibly expensive. These claims are based on an assumption that all costs of setting, administering, and grading exams would be add–on costs to operating school budgets. We think there is another possibility, one in which much of the cost would be absorbed in operating budgets because participation in examining would be seen as a part of the job definition for professional teachers. The Resource Group is ready to work on this question at the panel's request. We would want to consult with individuals outside our group to develop estimates of real costs under different assumptions.

Chapter 4
Science and Mathematics

An Interim Report From the Resource Group on Science and Mathematics

GOAL 4: **By the year 2000, U.S. students will be first in the world in science and mathematics achievement.**

Objectives:

- Math and science education will be strengthened throughout the system, especially in the early grades.
- The number of teachers with a substantive background in mathematics and science will increase by 50 percent.
- The number of U.S. undergraduate and graduate students, especially women and minorities, who complete degrees in mathematics, science, and engineering will increase significantly.

In early 1991, a Resource Group on Science and Mathematics was convened by the Panel to recommend indicators and strategies for measuring progress toward achieving this goal. Members of the group are as follows:

Alvin Trivelpiece	Oak Ridge National Laboratory, Oak Ridge, Tennessee (convener)
Iris Carl	Houston Independent School District, Houston, Texas
Linda Darling-Hammond	Columbia University, New York, New York
Edward Haertel	Stanford University, Palo Alto, California
Ken Lay	IBM, Armonk, New York
Steve Leinwand	Connecticut State Department of Education, Hartford, Connecticut
Michael Nettles	University of Tennessee, Knoxville, Tennessee
Senta Raizen	National Center for Improving Science Education, Washington, D.C.
Ramsay Selden	Council of Chief State School Officers, Washington, D.C.

The Panel and the Goal 4 Resource Group welcome your reactions to the Interim Report on Science and Mathematics.

National Education Goals
Goal Four

Science and Mathematics

I. Statement of Mission

Much has been written about the declining state of science and mathematics education in the United States. Most observers agree that extensive reform is needed. It is critical to the future of our country that we create an equitable, effective educational system that will allow our children to compete successfully in science and mathematics with students of other nations. At stake is more than economic superiority or a competitive edge in commerce. The quality of American life is endangered when people cannot make informed social and political decisions on issues that are increasingly shaped by science, mathematics, and technology. The Nation needs, in addition to a steady supply of scientists, mathematicians, and engineers, a scientifically literate and numerate population.

We must encourage students to express their natural curiosity about the world and not allow an archaic educational system to stifle their imaginations and tell them that these subjects are "too difficult" and only for an elite group. Too few of our young citizens are choosing science and mathematics careers, and too few are learning what is needed as entry-level knowledge for many jobs. One result is that the private sector must invest substantial resources to correct the problems handed down to them by our failing educational system.

Achieving the goal of "first in the world" in science and mathematics achievement by the year 2000 is an enormous challenge. To meet the challenge, the United States must develop an infrastructure that creates and nurtures a world-class education system. The strategic components of such a system require us to develop

- Supportive public attitudes and expectations that place a high value on scientific literacy and mathematics numeracy for all members of society.

- Widespread belief that all children can and must succeed in school science and mathematics.

- Teacher professionalism that is first rate.

- Fairness and equity for all children. Equity for all requires excellence for all; neither will thrive without high expectations.

- National curriculum standards for schools, districts, and States to use to build their science and mathematicsprograms.

- Tests, assessments, and accountability systems that measure the valued knowledge, skills, and processes promulgated by the national curriculum standards.

- Instructional materials and equipment and other learning tools for students who will spend most of their lives in a world that will continually be shaped by mathematics, science, and technology.

We have less than a decade to reach our goal. Baselines must be established for data that describe the products of our current system so that we know where we are and how to progress. Time is critical, yet we must develop sound procedures and techniques so that our assessments can inform our efforts to improve.

II. Structure of the Report

When the 22nd Annual Gallup Poll of the Public's Attitudes Toward the Public Schools asked about the National Educational Goals, Goal 4 fared very poorly. Among the six goals it was given the lowest priority (19 percent assigning low or very low priority) and the second lowest likelihood of attainment (65 percent saying unlikely or very unlikely). These public perceptions underscore why science and mathematics achievement appears as a goal separate from, and in addition to, Goal 3 on student achievement across the curriculum.

Because our future depends so directly on a steady flow of strong and imaginative research leaders, as well as a quantitatively and scientifically literate workforce and populace, we must overcome public doubts about the importance of Goal 4 and its attainability. In fact, traditional, incremental, small-scale change will be insufficient to make U.S. students first in the world in science and mathematics. Only bold, systemic changes coupled with new and different measures of success will allow us to attain this ambitious and critical goal.

Given the complexity of systemwide change, progress toward attaining this national goal must be charted on multiple measures. Moreover, the outcome-oriented nature of the goal and the clarifying objectives make it critical to monitor and report progress in science and mathematics in a multifaceted manner.

We propose that progress toward the attainment of Goal 4 and its accompanying objectives be monitored and reported on the basis of four sets of outcome measures:

1. student achievement in science and mathematics;
2. the infrastructure of mathematicsand science education;
3. the training of teachers in science and mathematics; and
4. enrollment and other mathematics and science pipeline data.

This framework provides a clear, useful structure for presenting the September 1991 Progress Report. However, it also serves to identify major gaps in currently available data and helps develop plans to gather more and better information for future reports.

III. Measuring Progress Toward Goal 4

A. Measuring Academic Achievement

Progress toward Goal 4 can only be measured directly through international assessments comparing the academic achievement of U.S. students in mathematics and science to that of students in other countries using the same instruments (in translation). To sustain such international assessments throughout the decade will require continual cooperation from other countries. One important factor in assuring such cooperation is to collect data that will be useful to all participating countries. This step will require extensive collaboration with other countries in the design of the assessment instruments and studies. The international assessments should do more than simply provide national comparisons of the academic achievement of students in mathematics and science. They should also collect sufficient information to provide a context for understanding the sources of national differences in academic achievement.

The achievement tests used in the international assessments should reflect the best thinking about the use of alternative assessments of higher order thought processes. The international assessments should be equated over time and where possible, across studies, so that international and national trendlines could be developed. Global trends in mathematics and science performance levels provide an important context for measuring and interpreting U.S. progress toward Goal 4.

1. Data Reported for the Nation as a Whole

There will be no new data available for the 1991 Progress Report, which can elaborate the results from the three international studies of science and mathematics achievement conducted during the 1980s, including the second international mathematics study (in 1982), the second international science study (in 1986), and the international assessment of educational progress (in 1988), covering both mathematics and science.

Public reporting of these data would help establish a baseline of where the United States stands compared with other countries. It is important to report data for all students. For the older students (upper secondary school), countries vary greatly in the percentage of students who remain in school. Thus, selectivity would need to be reported along with mean score levels for older students. It is probably better to report with countries as the unit and not to report data by province or language group. A decision must be made whether to report only data from industrialized countries or to include data from all participating countries.

There were 23 countries participating in the second international science study, 22 countries in the second international mathematics study, and 6 countries in the 1988 international assessment of educational progress.

2. Data Reported for States

We recommend the publication of State data for those States that participated in the international science and mathematics studies.

3. Data for Future Progress Reports

The planning for a second International Assessment of Educational Progress (IAEP–91) by the Educational Testing Service (ETS) is well under way. The study will include approximately 20 countries that will make assessments in science and mathematics. The data will be collected in 1991, and the results should be available in 1992 in time for the 1992 Progress Report.

The planning for the third international mathematics and science study to be conducted by the International Association for Evaluation of Educational Achievement (IEA) has begun. This study is to be conducted in 1994, and the initial reports of the results are to be available in 1995.

Data collection for a fourth IEA international mathematics and science study is scheduled to begin in 1998, and the initial reports of the results are to be available in 1999.

In addition, appropriate assessment instruments need to be developed for international comparison of America's college and university mathematicsand science curricula and for measuring the mathematicsand science achievements and abilities of America's college graduates.

4. Measurement Strategies

The following are some measurement strategies available for implementing the above recommendations:

- Administer periodically a common test to representative samples of students in different countries. There needs to be an evaluation of the alignment of such a cross–national test to national curriculum and instruction.

- Compare the content and performance on examinations in use in different countries, then establish equating procedures to determine the relative emphasis of instruction and learning in different countries.

- Explore the utility of allowing States to supplement international assessments with State samples so that States can compare the performance of their students to the performance of students in other countries.

- Investigate the use of different formats of the items in the assessment including, for example, the use of objective multiple choice, written essays, open–ended problems, and performance assessments.

B. Measuring the Strength of Mathematics and Science Education

Objective 1: Mathematics and science education will be strengthened throughout the system, especially in the early grades.

This objective clearly entails a systemwide approach to improving science and mathematics education. Critical components that must be addressed in concert include

- Standards for curriculum and learning goals.

- Instructional conditions, including school organization, curriculum materials and facilities, and instructional practices.

- Tests and assessments of student achievement and accountability systems.
- Provision and allocation of resources.
- Public attitudes and expectations.

Improvement in each of these components is necessary to achieve the strengthening of mathematics and science education throughout the system, and the improvement must ensure equal access for all students to high-quality mathematics and science education. Consequently, a complete progress report, whether at the national or State level, would track progress on each component and allow disaggregation by gender, ethnicity, socioeconomic status, primary language, and disabling conditions. Current information does not make this possible; available measures are limited at best. Some relevant survey data are available, as indicated below; some of these surveys are conducted on an ad hoc basis only. Missing to a large extent is information anchored in the observation of science and mathematics classrooms that would augment and support findings from survey data (largely derived from self-reports of students, teachers, and school authorities).

1. Standards for Curriculum and Learning Goals

At the national level, standards for curriculum and learning goals should be developed. The standards and goals should delineate essential content knowledge matched with the skills and attitudes that constitute mathematical, scientific, and technological literacy and at the same time provide the foundation for further work in these fields. The *Curriculum and Evaluation Standards for School Mathematics* produced by the National Council of Teachers of Mathematics (NCTM) and *Science for All Americans* produced by the American Association for the Advancement of Science (AAAS) are exemplars of widely endorsed national standard-setting efforts. The existence of such standards does not suffice, however.

To make national standards effective, relevant staff at every level will need to be aware of, adopt, and use these standards. The levels include State (central education staff), district (central education staff), school (principals and department chairs or equivalent), and classroom (teachers). Although awareness and adoption can be determined through surveys, use can only be established with any certainty through classroom observation.

a. Available for the 1991 Progress Report. Very little is currently available, except for some information on relevant instructional practice in IEA, NAEP, and NELS:88 (see below).

b. *To be developed for future Progress Reports*

(1) **Development of data sources.** Data sources that will provide information to set standards for curriculum and learning goals must be developed for the future. Information must be gathered on awareness and adoption of curriculum and learning goals and on use of the standards. To measure awareness and adoption, we recommend building appropriate questions into existing surveys (in order of preference): National Survey of Science and Mathematics Education (NSSME), to be repeated every 3 years (it is now ad hoc); Schools and Staffing Surveys (SASS) questionnaires (school and teacher level); Education Commission of the States' (ECS) surveys of reform practices and the Council of Chief State School Officers (CCSSO) indicator project State level; and NAEP teacher and school questionnaires.

(2) **Standards and goals.** On use of standards and goals, see below, under instructional context, for appropriate proxy questions in NSSME, SASS, NAEP, and IEA. IEA would provide some useful data for international comparisons. Also needed are in-depth case studies linked to the survey questions.

At the State level, the question translates into existence of State curriculum frameworks that incorporate the national standards. The same typology follows as at the national level: awareness, adoption, and use at the district, school, and classroom levels. No data exist currently, except possibly for the 1990 NAEP State-by-State mathematicsassessment, which may have very limited information on instructional practice. In the future, the State-level surveys suggested above (ECS, CCSSO) could be used to collect information on existence of reform curriculum frameworks in the States; awareness, adoption, and use could be tracked in the States with the measures recommended for the national level, provided the survey designs include State-representative samples.

2. *Instructional Conditions*

In general, instructional conditions should support the learning goals and curriculum standards delineated at the national level. Tracking instructional conditions means giving attention to the following factors and their distribution across different population groups:

School organization and structure: press for high achievement in mathematics and science for all students, courses offered (secondary school) or time devoted to mathematics and to science (elementary school), organization of instructional time (e.g., flexible scheduling), and organization of teachers' time and structure of decisionmaking.

- Materials related to the curriculum: textbooks and associated materials, equipment and laboratory facilities, and availability of computers and telecommunications technology.

- Instructional practices in the classroom: what is taught and how it is taught.

a. Data available for 1991 Progress Report. Current data sources on instructional conditions include NSSME, NAEP, NELS:88, and IEA. NSSME (data collected in 1986) and NAEP (1990 for science and math) have data on time spent, course offerings and mathematics textbook usage, and science and mathematics classroom activities. The NELS:88 original 1988 survey has some data; the 1990 followup survey has special supplements on the practices of science/mathematicsteachers of 10th graders. IEA has information on curriculum content coverage and provides international comparisons, but this information dates back to early- and mid-1980s.

b. Data to Be developed for future Progress Reports. To develop appropriate data sources for the future, we recommend continuing to include key questions on the three sets of factors in periodic surveys like IEA, NAEP, and SASS, and regularizing NSSME. Much developmental work needs to be done to create an efficient set of tracer variables. At the same time, survey information must be augmented by intermediate-level and in-depth information. Intermediate-level information would consist of material like teachers' logs and time-use budgets, analysis of materials used in the classroom, and analysis of student work samples. In-depth information entails classroom observation linked to the survey and intermediate-level information.

State-level information on instructional conditions should parallel the national level information. For survey information, the same sources can be used, provided they yield State-level as well as national information. (This is currently not the case for NSSME or NAEP, unless NAEP continues State assessments.) There are three unresolved issues at the state level:

- Developing appropriate questions that get at key tracer (proxy) variables and reporting clear, concise, and not misleading information that might lead to simplistic and ineffective or counterproductive policy "fixes."

- Increasing sample sizes to make information state-representative would greatly increase survey costs and response burdens; currently there is much more survey information collected than has been adequately analyzed; and

- Collecting in-depth information for every State through case studies or the like is not feasible; the intermediate-level information may have to suffice for reporting at the State level.

3. *Tests and Assessments*

At every level, tests and assessments must reflect the nationally defined learning goals and standards. At the national level, we agree with the Goal 3 report that NAEP data should be used for the present. The Goal 3 report provides reasons for the inappropriateness of other national-level tests. For the future, a major development effort is needed to bring NAEP mathematics and science assessments in line with the learning goals and standards enunciated by NCTM, AAAS, and other professional bodies.

At the State level, two pieces of information should be collected: the policies on State and district testing, and information on the nature of the assessment or test being used. Policies on State and district testing include subjects, grades, frequency, sample or census design. Some of this information is currently available for States (not for districts) from ECS and CCSSO, but collecting it needs to be regularized through ongoing surveys.

More important is the nature of the assessment or test being used at the State, district, and classroom levels. Current norm-referenced, commercially available tests are inappropriate because they do not reflect forward-looking learning goals and standards in science and mathematics education.

Studies have documented that teachers also use very limited tests and have little training in the range of techniques they should be using to assess their students' progress in mathematics and science. Therefore, reporting on the kinds of tests and assessments used at the State, district, and classroom levels should be accompanied by sample tests and protocols for other assessment techniques (e.g., observation of individual student and group performance, student work samples, teacher logs, and sustained science projects).

Two issues must be resolved for tests and assessments of instructional conditions to be effective: availability of test and assessment tools, and teacher awareness.

First, there are not enough good test items and assessment exercises available to construct satisfactory large-scale (State-level and district-level) assessments, particularly in science. Current testing formats militate against assessing students'' ability in designing and carrying out bona fide science investigations. If testing is not to undo curricular and instructional reform efforts, a significant development effort is needed to align large-scale assessments with learning goals and standards in science and mathematics.

Second, teachers need to learn, understand, and use assessment techniques appropriate to the learning goals and standards they are charged with achieving. Such teacher awareness will not be developed without a significant amount of relevant training incorporated in both pre-service and in-service education of teachers. A related need is understanding by school administrators (principals, district staff, State staff) of what constitutes a good test or assessment and how to report results to policymakers and the public.

4. *Provision and Allocation of Resources*

It is currently impossible to trace investments in science and mathematics education at any level--national, State, district, school, or classroom. The new Federal interagency coordinating effort should address this problem at the national level.

At the State and district levels, budgets should be constructed programmatically so that resource investments can be tracked. Again, the information should be organized so that it can be disaggregated by population group. (For example, do districts/schools that serve largely poor students or have a black or Hispanic majority invest at equivalent levels compared to schools with a white majority or schools serving middle-class communities?) It would also be of interest to know the discretion provided to principals and teachers at the school and classroom levels to buy expendable equipment and materials for science.

Another aspect of resource investment is the contribution to science and mathematics education from nonschool sources such as business and industry, professional societies, and community organizations. There is much anecdotal evidence of contributions of time, equipment, and other resources through partnerships and alliances with schools, but no systematic accounting exists. Such an accounting would serve two purposes, establishing the extent and kind of current involvement and encouraging its growth.

Unresolved issues concern the difficulties of constructing program budgets (especially at the elementary level) and tracking investments by nonschool organizations. However, without having that information, a key piece of data will be missing that could account for progress or lack of it on the other components critical in "strengthening mathematics and science education throughout the system."

5. *Attitudes and Expectations*

It is increasingly clear that part of America's student achievement problem stems from deep-seated beliefs and cultural dispositions that are starkly different from those in other countries. For student achievement to become first in the world, critical attitudes and beliefs must shift as well. Americans tend to believe that innate ability and inborn talent determine achievement in science and mathematics. Moreover, Americans, including educators at all levels, believe there are natural and inevitable tradeoffs between educational excellence and educational equity. However, *Everybody Counts*, the National Research Council's report to the Nation on the future of mathematics education, argues that excellence and equity excellence are compatible goals, converging on the single focal point of heightened expectations.

It is proposed that, along with international, national and State student achievement trends, data be gathered and reported on the perceptions among mathematicsand science educators regarding the long- and short-term value of mathematics and science, the personal and global importance of mathematics and science, the reasons for mathematical and scientific achievements, the likelihood of an individual's success in mathematics and science, the differential expectations along racial or gender lines in mathematics and science achievement, and mathematics and science as disciplines.

a. Attitudes on science and mathematics learning. Being first in science and mathematics learning will require a major shift in attitudes among students, teachers, and parents. America's student learning problems in science and mathematics stem in part from deep-seated beliefs that are different from those in other countries. Critical student, parent, teacher, and policymaker attitudes include:

- student self-perception with regard to learning potential/success;
- reasons for differences among students, including ethnic and gender differences;
- value/importance of science and mathematics on personal/global bases; and
- views regarding various disciplines in mathematicsand science.

b. *International data.* IEA mathematics and science studies include some student attitude data and could be used in the 1991 Progress Report.

The International Assessment of Education Progress, with about 20 different countries participating, will be available in March of 1992 for the 1992 Progress Report.

The IEA Third International Mathematics and Science Survey (TIMSS--Third International Mathematics and Science Assessment) is planned, in two phases, for 1994 and 1998. Student attitudes toward mathematics and science will be investigated. Results will not be available until 1995 and 1999, respectively.

c. *State and national data for the 1991 Progress Report.*

- The National Assessment of Educational Progress (NAEP). The NAEP State (eighth grade) and national 1990 mathematics assessment includes items regarding attitudes toward mathematics learning. The results will be available for the 1991 Progress Report. The NAEP attitude questions were asked of students in the 1986 science assessment, and the results could be used for the 1991 Progress Report.

- The National Education Longitudinal Study--NELS:88. The 1988 base year survey of eighth-grade students includes questions about student attitudes toward mathematics and science classes, and perceptions of their teachers. These are available for the 1991 Progress Report.

- The National Survey of Mathematics and Science Education--NSSME. The 1985-86 NSMME included a few teacher/principal attitude items about science and mathematics. Results of this survey could be used in the 1991 Report Card.

- The Longitudinal Study of American Youth--LSAY. The LSAY has some data on student and parent attitudes. Data have been reported on 9th and 12th grades for a cohort that is being followed.

d. *Potential data available for future Progress Reports.* The current plan is for NAEP 1990, 1994, and 1998 Science Assessments to include national data on student attitudes, similar to the mathematics assessment. The results of the 1990 Assessment will be available for the 1992 Progress Report on a national basis only.

The NAEP 1992 mathematics assessment with attitude items will be ready for State (fourth and eighth grades) and national indicators in time for the 1993 Progress Report.

The NELS:88 first followup survey of 10th graders conducted in 1990 will have some attitude data ready for the 1992 Progress Report. The survey of 12th graders will be conducted in 1992 with data available for the 1993 or 1994 Progress Report.

The second National Survey of Science and Mathematics Education is under review by NSF. If funded, teacher and administrator attitude items could be included. It is likely that this report will be available for the 1993 Progress Report.

e. Recommendations. The international comparison data are likely to be limited to the three studies reported above--IAEP and TIMSS Phase I and Phase II. Reports should be available for 1992, 1995, and 1999. A strong recommendation is that the attitude items included in the NAEP be at least as strong as or parallel to items used in TIMSS.

NAEP should be expanded to include additional student items on attitudes--particularly as they related to various disciplines within the sciences or content areas within mathematics. State data should be encouraged at all three levels of reporting in both mathematics and science.

Teacher and principal items specific to mathematics and science education should be included as supplements to the Schools and Staffing Survey (SASS)--only weak attitude-proxy measures are available through the sample of science and mathematics teachers.

Alternatively, the National Survey of Science and Mathematics Education should be conducted more regularly. Currently the study is funded on an ad hoc basis.

C. Increasing the number of teachers trained in mathematics and science

Objective 2: The number of teachers with a substantive background in mathematics and science will increase by 50 percent.

This objective needs to be treated in two parts, pre-service and in-service education. Pre-service education encompasses the characteristics of undergraduate and graduate education of prospective teachers. In-service education includes the characteristics and professional development of active teachers.

Pre-service elementary teachers frequently study little or no mathematics and science beyond high school. Their post-secondary coursework preparation for teaching these courses often consists of a one semester "methods" course. These coursework alone will not be sufficient; prospective teachers must also learn how to engage students in mathematical and scientific problem solving in ways that are consistent with the national standards. The pre-service education of secondary mathematics and science teachers must also ensure that these teachers are equipped to engage students in ways consisted with the national standards. We must develop ways to measure qualitative aspects of pre-service teacher education.

Assessing the substantive background in mathematics and science of teachers currently in the classroom has two aspects: tracking relevant characteristics of the teachers and tracking the amount and quality of staff-development opportunities available to them.

1. Tracking Teacher Background Characteristics

To track relevant teacher characteristics, profiles of the current mathematics and science teaching force must be assembled. The profiles must include elementary and middle-school teachers and should gather data on training, number and types of degree, age, experience, and so on, of the teaching force. This information should be collected by teaching assignment and should also be available by student population group. The relevant surveys should include State-representative samples so that the information can be reported both nationally and for each State.

There are several current data sources for characteristics of high school teachers: NELS:88 and the HS&B teacher followup ATS. These are one-time samples, however, and will be of little help beyond the 1991 Progress Report. SASS collects some of the relevant information as well. For the future, a special science/mathematicssupplement to SASS should furnish the relevant information. Alternatively, NSSME should be regularized, conducted every 3 years, and used to collect this information.

Teacher characteristics surveys should also include the proportions of current mathematics and science teaching force certified by current State license requirements, traditional and alternative license procedures, and temporary and emergency certificates. Such a survey will yield noncomparable information across States, especially at the elementary and middle-school levels. The importance of these data rests in distributional questions, for example, who does and who does not get certified teachers. SASS, CCSSO, and NSSME have pertinent information for 1991; they could continue to collect it in the future. A useful addition would be logging the States that have incorporated certification standards recommended by such national bodies as the NCTM and the NSTA.

To complete the teacher characteristics, data should be collected on the percentage of teachers with national board certification in science or mathematics. These data are available from the National Board for Professional Teaching Standards.

2. *Tracking Teacher Development Opportunities*

Assessing mathematicsand science teachers' background must also include surveying the availability, quantity, and quality of staff development opportunities for teachers at every level from elementary through secondary. Determination of quality should include measures of training in the use of computer and telecommunications technology in science and mathematics teaching, as well as training in assessment and testing strategies that match learning and curricular goals in science and mathematics. The tracking of opportunities should include those formal and informal staff development opportunities offered outside the regular district, State, and university structures (for example, by private-sector businesses and organizations). Both SASS and NSSME have some information; they could be expanded to collect more. Information on district and State policies with respect to staff development should also be collected.

3. *Unresolved Issues*

A number of issues concerning the assessment of science and mathematics teachers' backgrounds remain unresolved. We determined that teachers possessing an adequate science and mathematics background are a necessary but not sufficient prerequisite to teaching science and math. Teachers must also be able to construct teaching situations in which students will learn mathematics and science. In part, their competence to do so can be assessed through tracking teaching practices as recommended under the instructional conditions section of Objective 1. Teacher background assessments are important to consider under the second objective as well because of the need to build teaching competence in mathematics and science into pre-service and in-service education and to track the extent to which this objective is met.

Assessments of teachers' science and mathematics background are particularly difficult to achieve for elementary school teachers. Even though NSTA and NCTM have formulated standards for science and mathematics preparation for elementary school teachers, these hardly constitute a "substantive" background. Moreover, most teachers in the schools now did not receive preparation matching the standards. The relevant courses are not available on many campuses, either for prospective teachers or for in-service training. Note that much of the language throughout discussions of teachers in mathematicsand science refers to mathematics and science teachers, which completely ignores elementary school teachers and many middle-school teachers.

The second objective is silent on the need for principals and other administrators to be sufficiently prepared to understand what the teachers need to know and do. Some thought must be given to how to assess administrators' support and constructive criticism for science and mathematics teachers and how to collect the requisite information. SASS may have some relevant information and would provide a vehicle for the future.

4. General Recommendations

To achieve Objective 2, the Resource Group made some general recommendations:

- A focused survey or a set of coordinated surveys should be constructed to collect regularly the information needed to track Objectives 1 and 2. At present we have focused surveys that are not conducted regularly. We also have broad-purpose surveys that are conducted regularly but do not collect all of the necessary information. The lack of an integrated plan for data collections makes it difficult to assemble the appropriate data for the Progress Report.

- Survey information is broad, but not deep. It must be augmented by in-depth probes that reveal the realities of the classroom. An appropriate model is the combination of studies supported by NSF in 1976-77, including a survey of science and mathematics education (the forerunner of NSSME) together with a set of case studies of classroom practice involving classroom observation, interviews, and local-level surveys.

  For some purposes, intermediate-level information should be collected on a sample basis. Examples include but are not limited to identifying curricular content and goals at the classroom and school levels as described above, teaching practices in science and mathematics classrooms, and content of science and mathematics courses for prospective elementary school teachers. Appropriate techniques are being developed by the Center for Research on Evaluation, Standards and Student Testing at the University of California at Los Angeles.

- Research and development must be supported in two areas: the effective incorporation of computer and telecommunication technology in science and mathematics education, and the creation of assessment exercises and strategies consonant with the nationally enunciated mathematics and science learning goals and standards.

D. Enrollments and the Science and Mathematics Pipleline

Objective 3: The number of U.S. undergraduate and graduate students, especially women and minorities, who complete degrees in mathematics, science, and engineering will increase significantly.

1. Elementary and Secondary Education

a. Measures for 1991 Progress Report. International figures on enrollment and participation at the K–12 level are problematical. The structures of nations' school systems vary fundamentally in terms of the kinds of programs in which students participate at various grade levels. Specifically, beyond the age of 13 or 14, fundamental differences exist in the structures of public–private, vocational–general, and selective–open programs of various nations. Simply defining "enrollment" at a basic level in comparable terms is difficult. Beyond these problems, defining a "course" in mathematics or science is difficult. For instance, the U.S. uses a "layer–cake" approach in both areas, wherein students proceed through a sequence of courses each year in geometry, algebra, and calculus, or history, chemistry, and physics. In other countries, algebra or physics may be studied each year along with other subjects.

This has led to comparing the content students study by describing the topics they cover, regardless of course or program structures. Internationally, we should summarize for 1991 results of comparative coverage of curriculum from recent IEA studies in mathematics and science. These indicate in general that the U.S. curriculum in mathematicsis relatively repetitive and unambitious. It is strongly urged that international studies in mathematicsand science conducted during the 1990s include data on curricular coverage among students in participating countries and that this include measures that allow monitoring trends in coverage, preferably back to the studies completed in the 1980s. The 1991 report should include relatively brief, summarative data from the most recent studies on the relative extent to which U.S. students are exposed to a range of curricular topics in mathematicsand science.

Nationally, two sources are available for data on enrollment in mathematicsand science courses. As will be developed below, these figures are limited in what they tell us about the course content students receive, and they are subject to abuse or manipulation if they are used as high–stakes indicators. However, along with other date, they can be useful.

National data have been obtained from studies of samples of students' transcripts. These studies are available for students who were in the National Assessment of Educational Progress (NAEP) sample in 1987–88 and for high school seniors in 1982. Further, a study is planned for 17–year–olds tested by NAEP in 1989–90. This information should allow some analysis of trend over time.

The other source of course–enrollment data is the States. More than forty states have enrollment data using comparable definitions and procedures. This could allow aggregation of national estimates or at least "media state" figures.

Enrollment rates (percent of students who take a course sometime in their high school career) should be reported from the existing data in September, 1991. Data should be reported by a standard taxonomy of course content and should include break–outs by gender, ethnicity, and socioeconomic status, if available.

Course enrollments by themselves may mask actual course content. For example, what is included in a course titled "Algebra 1" may vary considerably. Further, reporting our status on course enrollments may stimulate spurious increases in enrollments without concomitant improvements in instructional content. Finally, attention to these data as a sole criterion of instructional content might further institutionalize course structures we do not wish to perpetuate (dividing "algebra" into two courses, instead of providing an integrated mathematics course as recommended by the national standards).

For these reasons, other, more detailed information on course content should be included. Data on topic coverage and instructional approaches are available nationally from NAEP, SASS, and NELS. These should be used in 1991 to augment and amplify course–taking figures.

State–by–State, course–taking data in mathematicsand science are available from CCSSO for about 40 states. This information is broken down by standard course titles and categories in each field and includes figures by gender for many states. Enrollment by race–ethnicity is available for few states.

By Fall 1991, data will be available from NAEP and SASS State–by–State at a relatively general level on relative topic coverage and instructional approach. For example, NAEP asks teachers the extent to which they emphasize several (less than a dozen) sub–areas of mathematics. This can be summarized State–by–State.

b. Measures for Future Progress Reports. International data available by the year 2000 will allow substantial enhancements of the kinds of data that can be reported. Planned international math–science studies in 1994 and 1998 should monitor trends in curriculum coverage over time, tracking back to the mid–1980s studies. Topic coverage or "opportunity to learn" variables are being built into these studies.

National and State–by–State data for the year 2000 should be fundamentally shifted. Course–taking data should be institutionalized at the state and national levels using state data systems and transcript studies. Especially important is development of data by gender and race/ethnicity. However, the United States has accurate, descriptive information on what students are taught. Ultimately, this is more appropriate than course–taking. We should begin regular surveys of curriculum coverage at the national and state levels in math, science, and other subjects. This could be done in conjunction with NAEP or SASS or through a new data-collection program.

2. *Postsecondary Education*

America's colleges and universities have a vital role to play in making America first in the world in mathematicsand science. Some databases are already available for progress reports on college enrollments and degree production in U.S. colleges and universities. These databases include race, sex, and citizenship distributions. But much work needs to be undertaken for the important international comparisons and for developing appropriate ways to measure the quality of college mathematicsand science curricula and student achievement.

Higher education's role can be viewed as twofold: First, to improve mathematicsand science instruction and outcomes in the primary and secondary schools by producing more mathematicsand science teachers; second, to strengthen the undergraduate mathematics and science curricula for college students majoring in mathematicsand science disciplines, for students preparing to become teachers, and for students who are not majoring in mathematicsand science but are pursuing associate and baccalaureate degrees in other disciplines.

The first of these two roles, training more teachers, is explicit in the objectives of Goal 4. The latter role is vitally important, but it is at most implicit in the objectives of Goal 4 because most people interpret the objective of strengthening curricula to apply only to elementary and secondary schools. Strengthening curricula in college-level mathematicsand science may be overlooked because the common perception is that America has superior colleges and universities, but inferior primary and secondary schools. That perception is influenced primarily by the strength of graduate programs in U.S. universities, which are attracting an increasing number of students from abroad, and because of the great research productivity of the Nation's leading university researchers. That popular perception, however, does not stem from the numbers of American citizens receiving mathematicsand science bachelor's, master's, and doctoral degrees or from the strength of undergraduate mathematicsand science curricula. The number of Americans majoring in mathematicsand science is declining, and there are no national or international assessments of mathematicsand science education that compare the knowledge and skills of recipients of U.S. baccalaureate degrees with their counterparts abroad.

Cooperative arrangements need to be established with other nations to provide comparable productivity indices. There is no available evidence that shows whether the undergraduate science and mathematicscurricula in America's college and universities are internationally competitive or whether the American recipients of baccalaureate degrees regardless of major have acquired the mathematicsand science skills that make them internationally competitive. The fact that American colleges and universities attempt to educate the masses rather than a select few, as in most other nations, suggests that the goal of becoming first in undergraduate mathematics and science education is no less challenging than it is at the primary and secondary school levels.

a. Monitoring Progress. The data and information for the higher education progress report should correspond to objectives and contributions that higher education attempts to make toward the goal. The objectives of Goal 4 that pertain directly to higher education are

- The number of teachers with a substantive background in mathematics and science must increase by 50 percent.
- The number of U.S. undergraduates and graduate students, especially women and minorities, who complete degrees in mathematics, science, and engineering must increase significantly.

b. Data Available for the 1991 Progress Report. The Integrated Postsecondary Education Data System (IPEDS) is an annual survey conducted by the U.S. Department of Education that provides baseline 1991 data on the number of recipients of baccalaureate, master's, and doctoral degrees by major field, ethnicity, and sex in United States colleges and universities. Institutional comparisons within States are also possible.

This database can also be used to monitor progress through the year 2000 and beyond. Colleges and universities participate in this survey voluntarily, but the overwhelming majority participate. This data base, however, does not show the number of teacher education majors who have an emphasis or concentration in mathematicsor science.

The IPEDS does not provide data on the number of Americans or foreign nationals who enroll or receive their degrees abroad, but it does report the number of foreign nationals enrolled and receiving degrees in participating U.S. colleges and universities. For the progress report to be complete, the degrees awarded by colleges and universities in Canada, Europe, Japan, China, and so on, in mathematics and science fields and in mathematicsand science teacher education disciplines comparable to those offered in U.S. colleges and universities must be monitored.

The Division of Science Resources Studies of the National Science Foundation (NSF) annually conducts the Survey of Graduate Students and Post Doctorates (SGSPD) in science and engineering fields. The survey involves all departments in science disciplines at all U.S. colleges and universities that offer master's and doctoral degree programs in the sciences, including all environmental, mathematical, computer, agricultural, biological, social, engineering, and health fields, as well as psychology. The results from this survey can be used to monitor trends in student enrollment in U.S. master's and doctoral degree programs including the sex, race/ethnicity, and citizenship of students enrolled. This survey also reports the aggregate financial assistance data that students receive at these graduate schools. Like IPEDS, however, it does not include an international component.

Adequate measures for judging the strength and quality of college and university mathematicsand science curricula or for international comparison do not exist for the September 1991 Progress Report. Such measures need to be developed for the year 2000 and beyond. The science and mathematics parts of the GRE are inappropriate for this purpose because they were designed for and are taken only by the select subpopulation of recipients of baccalaureate degrees who plan to attend graduate school; therefore, the context of these tests does not reflect the achievement outcomes expected of the general population of college graduates or the general population of science and mathematicsmajors in undergraduate school. In other words, the results of these tests do not represent the overall strength of the undergraduate curriculum or the science and mathematicsmajor curricula.

The Major Field Achievement Tests (MFAT), developed jointly by the Educational Testing Service (ETS) and Graduate Record Examination Board (GREB) in 1989, are multiple-choice tests used by a small number of colleges and universities to assess the achievement of college seniors in mathematicsand science (biology, chemistry, and physics) curricula. Some of the science professional societies have also developed standardized multiple-choice tests for college seniors majoring in the respective science disciplines. While these may be useful instruments to build on, they are not sufficient for assessing progress toward achieving national goals or for international comparison for the following reasons:

- They do not reflect national consensus among educators on the skills and knowledge that mathematicsand science majors graduating from U.S. colleges and universities should acquire.

- They do not reflect a national consensus on the science and mathematics knowledge and skills that graduating college seniors who are not science and mathematicsmajors should acquire.

- They do not reflect a national consensus on the methods of assessment that college and university faculty believe should be used to demonstrate progress toward national goals.

- In their present form they do not lend themselves to international comparisons nor do they reflect an international agreement about the science and mathematicsskills and knowledge that college graduates in mathematicsand sciences, teacher education, or other disciplines should acquire by the time they graduate from college.

c. *Recommendations for Future Progress Reports.* We recommend that:

- The IPEDS be used to report annually the trends on degrees conferred by U.S. colleges and universities.

- The SGSPD be used to report and monitor trends in graduate student enrollment in the mathematicsand science disciplines by sex, race/ethnicity, and citizenship in U.S. colleges and universities.

- The National Education Goals Panel establish a working group to develop comparable databases to the IPEDS and the SGSPD for participating foreign nations so that U.S. science and mathematics enrollments can be compared with those of other developed nations.

- The President and the Governors mandate an examination system that permits colleges and universities to measure both the strength of undergraduate science and mathematics curricula and the skills and achievement levels of students graduating from science and mathematics curricula in U.S. colleges and universities compared with other developed nations. This assessment will require international committees with representatives from participating nations to plan and develop these examinations.

- The organization in each of the 50 States responsible for licensing and certifying teachers be requested to provide data for each Progress Report on the number of mathematics and science teachers by race and sex who are certified and licensed to teach mathematics or science.

IV. Technology and Science and Mathematics Education

The impact that technology has had on the whole of society is not evident if one looks only at American education. Technology has revolutionized the practice of mathematics, science, and engineering; yet, it is little used for mathematics and science education. Only a few select schools are equipped with sufficient laboratory equipment and computing and telecommunications technology. Distance-learning techniques will become important tools for mathematics and science education. The exploitation of technology for improving education systems must be accelerated. This endeavor will challenge our imaginations and strain our budgets.

Vision and leadership at the highest levels of government are necessary. We must also recognize that large amounts of Federal support will be required to develop the educational technology required to support an advanced mathematics and science education system throughout the Nation. Individual schools, districts, or States cannot meet the financial requirements of advanced interactive systems. Federal support will also be required to encourage and ensure an adequate supply of well-prepared teachers who are able to use this technology and to address the new curriculum goals these initiatives require.

The Resource Group strongly supports the integrated interagency coordination started by the Committee on Education and Human Resources (CEHR) within the Federal Coordinating Council for Science, Engineering and Technology (FCCSET) of the Office of Science and Technology Policy. The emphasis placed on precollege education by CEHR is strongly endorsed. The efforts of this committee as well as the Systemic Initiative supported by the National Science Foundation should have a major impact on activities related to Goal 4.

The Resource Group supports the development of a national clearinghouse concept that would integrate existing information sources, provide rigorous quality control, interact with FCCSET-CEHR and other organizations, and serve as a national information resource for instructional materials, outstanding programs and activities, and assessments.

We must develop a sound infrastructure on which to build the educational system that will equitably provide world-class mathematics and science education for our students. If we do not create the necessary infrastructure, we will not realize our goal.

V. Epilogue: A Vision of Science and Mathematics Education in the Year 2000

The following is our vision of a first-class education system for in the year 2000. Guiding principles will include the following:

- Each education system is guided by the basic principle that each student can and will attain mathematics numeracy and scientific literacy.
- The standards of learning expected for each child when achieved will enable successful participation in future science, mathematics, and technical education

and work opportunities in a world where science, mathematics, and technology play a critical role.

- The predictive power of sex, race, and ethnicity with regard to successful science, mathematics, and technical learning will be eliminated.

- Our vision anticipates that in the year 2000,

    - Teachers will possess the requisite mathematics, science, and technical knowledge and pedagogical skill and have the time to learn new content in science and mathematics, to gain an understanding of student learning and development, and to explore alternative ways to design active learning opportunities.

    - Each student will be fluent in the language and culture of mathematics and attain scientific habits of mind.

    - Students will experience a variety of active learning opportunities and teaching strategies designed to encourage participation and motivate continued study in mathematics, science, and technology.

    - Students will be engaged in learning opportunities that are authentic with regard to mathematical, scientific, and technical work, including the use of technologically up-to-date equipment that is aligned with the tools of science (calculators, computers, rich databases, optical and electronic networks and telecommunications systems, energy sources, and measurement instruments).

    - Students will enjoy the pursuit of knowledge driven by their natural curiosity and the construction of knowledge from the experiences and resources provided.

    - Working in teams and individually, each student will be responsible for his or her own science and mathematics learning.

    - Students will undertake science projects in which they will experience discovery by amassing evidence; making and checking hypotheses; searching for and finding patterns; theorizing; experimenting; and making conjectures, proving relationships, and applying them to real and hypothetical situations.

- Each student will have the concentrated time, quality instruction, and multiple opportunities to learn, including second and third chances to make up for lost or missed content, courses, or requirements.

- Each student will be judged by authentic examinations and assessments of knowledge, understanding, and skill that reinforce mathematics and science learning goals and are integrated into the education program of the school.

Further, our vision imagines modern school systems in which

- Each school will be operated and organized on the principle that student learning in science and mathematics is among the highest priorities in the allocation of time and other resources, recruitment of personnel, design of assessment and accountability systems, and use of facilities and equipment.

- Each school will be structured so that people making decisions about the mathematics, science, and technological programs are knowledgeable in those areas and are guided by the active involvement of scientists, mathematicians, engineers, and persons with technical expertise.

- Schools will be governed so that those responsible for implementing learning programs are actively engaged in design teams that have the flexibility to deploy people, time, materials, equipment, and facilities in ways that lead to more productive and lasting learning of science and mathematics.

- Schools will be imbued with a spirit of experimentation in science and mathematics education that encourages creative, innovative approaches to learning with results documented and used to inform future decisions.

- Each school will be equipped with a rich variety of resources connected through a system of electronic telecommunications networks. These networks will access resources for teaching, learning, and professional development and will be able to communicate in a timely manner with each other, with important constituencies, and with those engaged in monitoring the condition of the education system.

- Schools will be committed to actively recruiting high-quality teachers to ensure that new teachers are inducted and prepared to take on a variety of roles.

Chapter 5
Adult Literacy and Lifelong Learning

An Interim Report From the Resource Group on Adult Literacy and Lifelong Learning

GOAL 5: **By the year 2000, every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsiblities of citizenship.**

Objectives:

- Every major American will be involved in strengthening the connection between education and work.
- And workers will have the opportunity to acquire the knowledge and skills, from basic to highly technical, needed to adapt to emerging new technologies, work methods, and markets through public and private educational, vocational, workplaces, or other programs.
- The number of high-quality programs, including those at libraries, that are designed to serve more effectively the needs of the growing number of part-time and mid-career student will increase substantially.
- The proportion of those qualified student (especially minorities) who enter college, who complete at least two years, and who complete their degree programs will increase substantially.
- The proportion of college graduates who demonstrate an advanced ability to think critically, communicate effectively, and solve problems will increase substantially.

In early 1991, a Resource Group on Adult Literacy and Lifelong Learning was convened to recommend indicators and strategies for measuring progress toward achieving this goal. Members of the group are as follows:

Mark Musick	Southern Regional Education Board, Atlanta, Georgia (convener)
Paul Barton	Educational Testing Service, Princeton, New Jersey
Forest Chisman	Southport Institute for Policy Analysis, Washington, D.C.
Peter Ewell	National Center for Higher Education Management Systems, Boulder, Colorado
Patsy J. Fulton	Oakland Community College, Bloomfield Hills, Michigan
James R. Morris, Jr.	South Carolina State Board for Technical & Comprehensive Education, Columbia, South Carolina
William Spring	Federal Reserve Bank of Boston, Boston, Massachusetts
Tom Sticht	Applied, Behavioral, and Cognitive Sciences, Inc., El Cajon, California
Marc Tucker	National Center on Education and the Economy, Rochester, New York

The Panel and Goal 5 Resource Group welcome your reactions to the Interim Report on Adult Literacy and Lifelong Learning.

National Education Goals
Goal Five

Adult Literacy and Lifelong Learning

I. Introduction

Measuring the Nation's and States' progress toward achieving the national education goal for adult literacy and lifelong learning poses a special challenge. The challenge begins with the fact that there is no single definition of literacy. This goal and its objective encompasses multiple definitions, ranging from the most basic literacy skills through workforce skills demanded by an internationally competitive economy and baccalaureate-level skills of well-prepared college graduates. Consequently, this goal and its objectives demand a wide range of measures. Only by including indicators of the extent to which the Nation and States are making progress on the objectives as well as the larger goal can we obtain a full picture of adult literacy and lifelong learning.

The goal is also difficult to measure because there is no "system" that is being measured. The literacy and workforce programs referred to are scattered throughout society--at the workplace; in unions; in employment and training programs; in libraries, YMCAs, and myriad voluntary and associational programs; and in public and private vocational-technical schools, colleges, and universities. The State role may include providing incentives to expand opportunities, to fill gaps in services to adult learners, and to ensure the quality of service through accreditation and licensing if public funding is provided. To collect the data in order to report on State and national progress in 1991 or to develop an effective data system, we will need to rely on the cooperation and good will of these varied providers and individual citizens.

Beyond the challenge of reporting on a vast array of private-sector activities, public entities will need a more systematic means of reporting information on the participation and achievement of their participants. This is particularly true for the postsecondary level. Many States now lack the ability to track students through the postsecondary system, although some powerful State models do exist. All States lack the ability to report systematically on the ability of their college graduates to think critically, communicate effectively, and solve problems.

II. The September 1991 Progress Report

A. Data Reported for the Nation as a Whole

1. *Recommended Measures*

We *recommend inclusion* of national indicators from the following eight national data sources' baseline measures for the September 1991 Progress Report. We will also note the ability of these sources to provide State-by-State data.

For baseline measures of the goal of literacy, the Resource Group recommends the following:

a. Scores from the 1985 National Assessment of Educational Progress (NAEP) young adult literacy assessment. No comprehensive national information is currently available on adult literacy. Baseline information will become available from the National Adult Literacy Survey in 1993. For September 1991, we recommend data from the 1985 National Assessment of Educational Progress report on the literacy skills of young adults ages 21 to 25 years. The survey assesses three types of literacy skills: prose comprehension (measuring the knowledge and skills needed to comprehend texts); document literacy (measuring ability to use and interpret practical documents, such as bus schedules and job application forms); and quantitative literacy (measuring ability to apply basic arithmetic in everyday uses, such as checkbooks or order forms). These same categories of skills are assessed in the Department of Labor's literacy assessment of special populations and the National Adult Literacy Survey that is currently under way. Thus, the NAEP young adult survey provides a partial baseline for future studies and longitudinal analysis. The information can also be reported by racial/ethnic group and by level of educational attainment.[1]

b. The Department of Labor assessment of literacy skills of special populations of under-employed or unemployed workers. The Department of Labor (DOL) commissioned the Educational Testing Service to conduct an assessment of Job Training Partnership Act participants and applicants for employment service and unemployment insurance applicants. The survey results can be analyzed according to racial/ethnic classification, educational attainment, and income status. The assessments were conducted in 1989 and 1990, are currently being analyzed, and should be available for the September 1991 Progress Report. Two States--Mississippi and Oregon--have also modeled their own assessments of adult literacy on the DOL survey; data from these surveys will be available for the 1991 Progress Report.

The Department of Labor does not plan to continue these special assessments. The Resource Group recommends that the Panel weigh the usefulness of these reports. If they are found useful, the Panel may want to recommend that DOL repeat these assessments later in the decade.

c. Armed Services Vocational Aptitude Battery. The Armed Services Vocational Aptitude Battery (ASVAB), which includes the Armed Forces Qualification Test (AFQT), is a vocational aptitude assessment of the basic and technical literacy skills of individuals who are seeking to enter the workforce by applying for military service. It is taken only by persons seeking to be enlisted personnel, approximately 700,000 persons per year. Data for all of the tests are available by racial/ethnic group and gender. While this information represents a limited and self-selected segment of the population, it is an important and underutilized source of data about the basic skills and knowledge of a portion of American high school students and young adults. The AFQT consists of two reading tests and two math tests. The cutoff composite score on these tests is equated to approximately the 6th grade level and has been set by Congress as a score below which individuals are ineligible for military service.

The Resource Group recommends that AFQT scores be reported on a national basis. We do not recommend reporting scores on a State-by-State basis, since the variability among the population taking the test in different years within a State is too great. We also recommend that this assessment battery be renormed no later than 1995.

For baseline measures of the objectives under Goal 5, the Resource Group recommends the following:

d. Department of Labor survey on workforce preparation. DOL is conducting a survey of how workers receive their skills preparation. The Resource Group recommends using the results from this survey (if they are available) for the 1991 Progress Report. This survey is a supplement to the Current Population Survey (January 1991). It may be possible to compare the results of the 1991 survey with a similar survey conducted in 1983 to show a trend, but there is a limitation: The 1983 survey focused on training-related activities rather than educational services. If available, the data from this survey will be a useful indicator for establishing a baseline on Objective 2, but with a caveat. Objective 2 refers to workers' opportunities to acquire the basic to highly technical knowledge and skills needed in a competitive workforce. The caveat is that the survey will provide information on workers' participation in a range of education and training programs, but it will not provide information on the extent to which education and training opportunities are available to workers. New surveys of the business and educational communities will be necessary to complete the picture of existing opportunities. In addition, data may be reported for specific States and/or large cities with larger samples in the survey, but they will not be available for all States.

e. National Household Education Survey (NHES). The source of the NHES is the National Center for Education Statistics (NCES). The Resource Group recommends that the Panel use the NHES survey to measure American participation in adult learning programs. This information will serve as a baseline for Objective 2, referred to above, and Objective 3, i.e., quality programs to serve part-time and mid-career students.

The NHES is a new data collection system that is being implemented in the spring of 1991. The Resource Group recommends that the Panel ask NCES to provide information from the 1991 survey for the September 1991 report, including the percentage of adults enrolled in courses/training; the percentage of adults paying for their courses/training; the percentage of adults enrolled part time; and the percentage of adults enrolled in various categories of programs, such as programs for literacy, management, or specific job skills. While the survey will be conducted annually, only the 1991, 1994, and 1997 surveys will ask questions about participation in adult learning programs. The survey will provide national, but not State, data.

As with the DOL survey of workforce preparation, the NHES will provide important information about participation in adult learning programs but will not provide information on the need adults perceive for such programs and the actual opportunities available to them.

f. Integrated Postsecondary Education Data System (IPEDS) enrollment information. The source for IPEDS enrollment information is enrollment reports from vocational education, colleges and universities, and proprietary institutions. The Panel can use IPEDS as one measure of opportunity to acquire needed knowledge and skills. IPEDS collects information on all 11,687 postsecondary institutions and educational organizations, accredited and nonaccredited. The IPEDS system collects institution-level data on enrollments, program completions, faculty/staff, and financing. The Resource Group recommends that the Department of Education and the National Education Goals Panel staff develop a plan for presenting the enrollment information at both the national and State levels.

g. Associate and baccalaureate degree recipients from longitudinal studies conducted by the National Center for Education Statistics: National Longitudinal Study of the High School Class of 1972 (NLS:72) and High School and Beyond which started in 1980 (HS&B:80). These studies track the education and employment of students who completed high school in 1972 and 1980, respectively, and relate to Objective 4, which calls for substantial increases in college attendance and degree completion (associate and baccalaureate), particularly for minorities. Followup studies of these high school graduates provide a national indicator of college attendance patterns, including persistence and completion. The class of 1972 can be compared with the class of 1980, and these trend data on attendance and graduation can be reported in the September 1991 Progress Report. The data should be reported by racial/ethnic category.

A third longitudinal study was begun in 1988 of the 8th grade class. Followup studies of that class in 1992 and later in the nineties will provide additional information about college attendance and completion patterns for these students. There is a State option to participate in the NLS, and a few States have done so. In a few other States the numbers of individuals sampled are large enough that information on these States is available. These two combinations amount to 12 States where state longitudinal data could be reported for the 1980 high school seniors. The Resource Group recommends that States participating in the longitudinal studies be asked to supply these data. Even limited State data may encourage more, and more useful, State data. In addition, there is an option available (NELS:88) for any State to contract for a sample large enough to yield State results.

Given the three longitudinal studies described above, it will be possible to monitor progress through the decade using data from the 1991 report as the baseline.

h. Use IPEDS enrollment and degree information to calculate a graduation rate. The Resource Group recommends that the Panel use a proxy measure as described below to report graduation rates at both the national and State levels until States' student unit-record systems, or their equivalent, are in place. Longitudinal studies have the disadvantage of being available only for a limited number of States. To deal with this problem in the short run, we suggest using the proxy measures from IPEDS.

IPEDS collects information on first-year student enrollments, age of enrollees, and number of associate and baccalaureate degrees awarded, by race and ethnicity. Until effective systems are in place to track student enrollment patterns within a higher education system or State, a proxy or indirect measure of graduation rates may be produced. The proxy is determined by dividing the total number of first-time students in a given year into the number of students completing associate degrees 4 years later and the number completing baccalaureate degrees 6 years later, or 150 percent of the expected time of completion to a degree. (One hundred fifty percent of expected time is also the figure being used in calculating graduation rates in the Students Right to Know legislation [see below]). The graduation rate calculated from IPEDS data would be an interim measure of Objective 4.

i. State survey on number of high school graduates by racial/ethnic group. In order to report on the proportion of qualified students who enter college out of high school, the Resource Group recommends that the Panel request from each State the racial/ethnic data on its high school graduates. This information on high school graduates can be used in conjunction with information on college attendance and first-year enrollments from IPEDS to measure progress toward this objective indirectly.

2. *Measures not Recommended for Publication in the September 1991 Report*

We *recommend against* using the following:

Graduate Record Examination (GRE) scores. The Resource Group does not recommend using the Graduate Record Examination taken by some college graduates as a measure of Objective 5, which refers to college graduates' ability to think critically, communicate effectively, and solve problems at an advanced level. The use of the GRE as an indicator has the same basic problems as the use of Scholastic Aptitude Test (SAT) and American College Test (ACT), referred to in the report of the Achievement Goal Resource Group. An unscientific and self-selected sample of students take the GRE. Therefore, changes in the population of students taking the examination can effect the average scores in a given year more than what college graduates know and are able to do. While a majority of high school graduates take the SAT and ACT, a small minority of college graduates--namely those who are applying for selected graduate programs--take the GRE.

3. *Unresolved Issues*

There is no indicator available for the September 1991 report relating to Objective 1, strengthening the school-to-work transition.

The Resource Group also has found that there is little information on opportunities for training.

B. Data Reported for States

1. *Recommended Measures*

In addition to State data from IPEDS and from longitudinal studies, we are recommending that new surveys be administered immediately to obtain additional information.

a. Results of adult literacy surveys conducted in Mississippi and Oregon. As previously noted, the Resource Group recommends that the Panel include information on the literacy of adults in these two states for the September 1991 Progress Report. While State-by-State data are not available to establish a baseline on the literacy skills of adults in all States, the data from Mississippi and Oregon are illustrative. These two States have conducted their own systematic literacy surveys, using the literacy assessment instrument developed by the Educational Testing Service for the Department of Labor. The data will be available for the 1991 Progress Report.

b. State estimates of persons needing literacy training. The Resource Group recommends that the Panel ask each State to estimate the number of persons who need or are eligible for literacy programs and the percentage of persons being served by such programs. The definition of literacy used for States should be broad, referring not only to basic literacy, but also to workforce literacy skills.

c. General Educational Development (GED) awards. The Resource Group recommends reporting the number of GED certificates awarded in 1990 and annually thereafter. This information will be available for the September 1991 Progress Report. The group recommends that this figure be placed in context by also reporting the percentage of persons ages 18 to 34 who do not have high school diplomas or GED certificates. Another possible indicator is for States to report the proportion of people taking the GED who failed to pass it. This information is also available in 1991. Even if high school graduation rates rise significantly in the coming decade, an increased number of GEDs awarded over the next 10 years will be a positive indicator of increased literacy.

d. Reports of graduation rates from States that have student unit record systems at the college level. For the September 1991 Progress Report, the Resource Group recommends that the Panel request States with student-based unit record systems and other viable record systems, such as special retention studies, institutional reporting systems, or coordinated institutional-based reporting studies to report on the overall retention and graduation rates at their public colleges and universities. Rates should be reported separately for 2-year and 4-year colleges. Where available, the information should be presented by racial/ethnic group.

About one-third of the States have student unit record systems in place or in the final stages of implementation. Another dozen States conduct periodic studies of retention and degree completion by requiring institutions to submit aggregate performance data. In both cases, information is only available on public institutions. About 15 states have no systems for reporting retention and graduation rates. While the 1991 Progress Report would not have information on all States, it is important to give greater emphasis to the information that is available and to encourage States without these systems to consider improving their retention and graduation data systems.

e. State surveys on assessment of college seniors' critical thinking skills. Direct information on college seniors' performance is not available at this time. The most feasible way of directly determining these skills would be a national assessment targeted to a national sample of graduating seniors. Developing such an assessment would take much of the decade. For the present, the Resource Group recommends that the Panel ask each State to indicate whether it has systems to measure college students' and graduates' ability to think critically, communicate effectively, and solve problems. States should also be asked to describe the systems briefly.

III. Data Being Developed for Reporting During the Decade

The Resource Group on Goal 5 has several suggestions for the development of measures and indicators by the end of the decade. In the interim, assessments now in the implementation stage, chiefly the National Adult Literacy Survey (NALS), will become available in the next few years. The Panel should use these assessments until the measures envisioned in the future data system design (section IV) become available.

A. Data for the Nation as a Whole

1. National Adult Literacy Survey (NALS)

The National Adult Literacy Survey is an assessment of knowledge and skills of adults. It was developed by NCES under the jurisdiction of the Department of Education. The assessment is being field tested in 1991, will be administered in 1992, and can provide national information in 1993. States have an option to participate in the survey at a cost of approximately $350,000 spread over a 3-year period. While the survey is not a perfect measure of the adult literacy goal, it is a useful measure of progress and represents a substantial national investment.

NALS is administered to a sample of households in order to estimate literacy. It does not yield scores for individuals. NALS will not and should not be used to measure the success of individuals in literacy programs, to evaluate individual literacy programs, to assess the instructional needs of individuals, or to design instructional programs.

The law creating NALS calls for quadrennial surveys, in which case the next administration of the survey would occur in 1996, with data available in 1997. The Resource Group recommends that the survey be conducted as scheduled in 1992, that modifications suggested in section IV of this report be considered for adoption, and that the National Adult Literacy Survey be administered again in 1995 and 1998.

2. *Definition of Worker Competency skills by the Department of Labor*

The Resource Group recommends that as information becomes available from the Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) initiative, it should reviewed by the Panel for possible inclusion in later reports. The DOL is developing a measure of the Nation's adult training and education needs. DOL's SCANS program, currently under way, is intended to help define the necessary functional and higher level skills needed by entry-level workers across a spectrum of jobs from manufacturing to the service sector. This effort will include defining competencies needed to succeed in high-performance jobs.

B. Data Being Developed for States

1. *Literacy Results for States Participating in the 1992 NALS*

As mentioned previously, States have the option to participate in the National Adult Literacy Survey. The scores from the States participating in the 1992 NALS should be included in the 1993 Panel report. Florida, Illinois, Iowa, and Texas are reportedly planning to conduct State-level adult literacy surveys in 1992. Other States are considering participating in the full-scale 1992 NALS. Efforts could be made to reduce the cost for States to participate in NALS by federal cost-sharing arrangements or concerted State efforts to secure private contributions to help offset costs.

As other States participate in the 1995 and 1998 surveys, their results should also be reported.

2. *Other State Literacy Assessments*

All States should be conducting some sort of literacy assessments. If States are not participating in NALS, other alternatives need to be considered that would provide States with important information, including how a State's literacy levels and progress compare to that of the Nation. For example, States might develop shorter versions of the National Adult Literacy Survey, perhaps in conjunction with universities or other groups. States and the Department of Education could begin by looking at factors that make NALS more costly, and might consider options to reduce costs. The States and the Department of Education would need to determine whether the lower-cost version would be feasible and provide valid and reliable information on adult literacy.

Another option is for States to adopt some procedure, such as the Comprehensive Adult Student Assessment System (CASAS), now being used by several States. CASAS has been used in States primarily for assessments of individuals in specific programs, i.e., welfare recipients. This option costs less than NALS because CASAS is not administered to households. The Resource Group suggests that the Department of Education sponsor research to determine how CASAS, similar literacy assessments, and the Graduate Equivalent Diploma (GED) can be equated with measures on the National Adult Literacy Survey.

3. *Use Graduation and Completion Rate Information Reported by Public and Private Postsecondary Institutions for the Student Right to Know Act*

The Federal Student Right to Know Act of 1990 requires all postsecondary institutions, public and private, including those that offer non-baccalaureate vocational programs, to report the completion or graduation rates of all certificate- or degree-seeking full-time students. Institutions are to begin recording and collecting this information by July 1, 1991, and to complete reports by July 1, 1993. The law specifies that students may be counted as completing a program or graduating if they complete it "within 150 percent of the normal time for completion of or graduation from the program." They are also considered to have completed a program if they transfer to a program at another institution.

The Resource Group recommends that the National Education Goals Panel plan on including information from the Student Right to Know Act when the system is fully operational. Our experience with data systems leads us to suspect that by 1994 or 1995 the Student Right to Know Act may yield important and credible information for the private as well as the public sectors.

IV. Future Data System Design

The Resource Group recognizes the limitations of currently planned and available information on adult literacy and lifelong learning. Specifically, we recognize a substantial need to develop or modify assessment strategies in six areas: Enhancing the national adult literacy assessment in order to use it as an international indicator of workforce skills; developing benchmarks or targeted scores for the NALS; surveying businesses to determine the degree of their involvement in school-to-work transition and workforce training programs; commissioning periodic national polls on adults' perceived need for education and training; implementing student-based unit record systems at the postsecondary level in every State; and developing a national assessment for college seniors.

A. Recommended Future Measures

1. Strengthen the National Adult Literacy Survey and Use It to Obtain International Comparisons of Workforce skills

The Resource Group recommends that the Department of Education review NALS and develop a process for making any needed modifications and improvements. Any modifications should be made prior to the administration recommended for 1995. The Department of Education should consider issues such as the extent to which the National Adult Literacy Survey (a) can provide useful literacy information about persons for whom English is their second language; (b) can be related to literacy skills needed for employment in high-performance workplaces; (c) can include additional mathematical measures not related directly to reading skills; and (d) can provide useful information about adults functioning at very low literacy levels.

Americans should know how the functional literacy skills of their workforce compare with those of other developed nations. The adult literacy goal calls for "skills necessary to compete in a global economy." These skills may include the understanding and use of technology, problem solving, and the ability to learn. Knowing more about the skills of the American workforce compared with international measures will tell the Nation much about the competitive standing of the United States in the world economy. An enhanced National Adult Literacy Survey may provide the means for reaching agreements with other nations to measure cooperatively workforce skills.

2. Developing Benchmarks or Targets for the National Adult Literacy Survey

The Resource Group recommends that the Panel initiate a process to develop targeted scores for the NALS. The Panel should ask the Departments of Education and Labor to start the substantial research effort needed for this development. While the information to create target scores is not available now, we believe that it is possible to bring informed judgment and research to bear to establish target scores for performance on the National Adult Literacy Survey. The target scores should attempt to reflect the skill levels needed for American adults to function in the workforce and to take part in a representative government. Indeed, we are not recommending a single "cut point" on the assessment. Although developing several targeted scores for performance on the NALS will require a major effort, it might be possible to complete this process by 1995.

3. *Surveying Businesses to Determine the Degree of Their Involvement in School-to-Work Transition and Workforce Training Programs*

As discussed above, the existing indicators of worker opportunity for education and training programs, namely the Department of Labor's periodic survey of workers' skills preparation and the Department of Education's National Household Education Survey, in reality measure the extent to which adults are taking advantage of opportunities. To assess the opportunities that are actually available, surveys of the business community need to be conducted. The Resource Group recommends that the Panel ask the Department of Labor to develop a systematic process for surveying a broad cross section of businesses across the Nation.

The surveys would ask employers about the extent to which their business connects work experiences with the schools and offers transition opportunities, such as apprenticeships. They might also ask about employer satisfaction with new entrants into the labor market. The surveys should also be used to determine efforts by businesses to aid their workers in acquiring basic to highly technical knowledge and skills. Major investments are being made by businesses in training the workforce, but the Nation has little reliable information about these efforts.

4. *Information from Periodic National Polls on Public Need for Education and Training*

The Resource Group recommends that periodic national polls be commissioned to gauge the American public's perception of its needs for, and availability of, education and training opportunities, and the nature of these opportunities. The polls should be comprehensive enough to provide breakout information on major industrial sectors.

5. *Surveys of Adult Educational Programs in Postsecondary Institutions, Libraries, and Other Educational Institutions*

The Resource Group recommends that national and State representative sample surveys of adult education programs be commissioned two or three times during the decade. The surveys would be designed to report on the availability and effectiveness of such programs.

6. *Encouraging All States to Adopt Student-based Unit Record Systems or Comparable Systems to Track Student Enrollment, Retention, and Degree Completion in Public Postsecondary Institutions Statewide*

As discussed earlier, several States have developed or are implementing student-based unit record systems or similar processes for tracking students. The data provided by such systems are preferable to the indirect measures of graduation rates referred to above. The indirect measures are based on calculations from IPEDS. Student unit record systems provide more detailed information about student completion and graduation rates within a State. Individual enrollment patterns are tracked, in some instances using Social Security numbers. Students' college participation is followed regardless of whether they leave school for a time or transfer from one institution to another. The limitation of these tracking systems is that they are confined to the public sector and do not report graduation rates at private postsecondary institutions. The Panel should encourage all States to develop unit record systems. These systems should use common definitions and standardized reporting procedures that will yield generally comparable data from State to State.

7. *Assessing the Knowledge and Skills of Graduating Seniors*

As noted in the section on State data available for the 1991 Progress Report, neither national nor State information is currently available on the ability of college graduates to "think critically, communicate effectively, and solve problems." At present there are no plans to develop a system for assessing the skills of a national sample of college graduates. It is possible that within the decade, individual States may develop measurement instruments capable of assessing these skills at the graduating senior level. For example, New Jersey has developed a test of General Intellectual Skills (GIT) that is administered to end-of-year sophomores. The possibility of wide-scale administration of a comparable assessment in several States appears remote.

If the National Education Goals Panel wishes to attempt to assess the ability of college graduates to think critically, to communicate effectively, and to solve problems, a new kind of assessment will have to be created. That assessment might be a type of National Assessment of Educational Progress (NAEP) at the college level, given to a national sample of students at different kinds of institutions across the Nation. To have credibility, such an assessment would have to take into account the differences in the postsecondary institutions in America and the fact that the pluralistic system in place today has extended postsecondary educational opportunities to the broadest cross section ever of America's citizens. Developing a NAEP-like collegiate assessment would be controversial for many reasons. It would require perhaps 5 years or more to develop and an investment of several scores of millions of dollars to make operational.

B. Rejected Future Measures

Use of the National Adult Literacy Survey (NALS) as a measure of college graduates' performance. The Resource Group recommends against using the NALS as a measure of college-level performance even though it is administered to the college graduates included in the survey. There may be many reasons not to use the NALS to measure progress on the objective of college achievement. The charge of Objective 5 is to increase the advanced ability of college graduates to think critically. The most obvious reason for the Resource Group's negative recommendation is that using a literacy test that includes material at the elementary school level to measure the ability of college graduates to "think critically, communicate effectively, and solve problems" is not appropriate.

C. Summary

The Resource Group for Goal 5 has outlined a system-wide agenda for indicators measuring adult literacy and lifelong learning for the September 1991 Progress Report and throughout the decade. This agenda includes collecting information on the range of literacy skills possessed by and expected of American adults, from basic literacy skills though skills need to function in a competitive workplace to higher-order literacy skills expected of college graduates.

The Resource Group has also proposed that the National Education Goals Panel collect information on adults' participation in the education and training programs available in the Nation, including postsecondary programs, public employment and training programs, workplace programs, and others.

The Resource Group also recommends that the Panel gather information on the extent to which opportunities are available for adult learning programs across the States and Nation.

Many gaps exist in the present data system; the Resource Group recommends that the Panel initiate a process to fill them. Overall, data are more incomplete for States than for the Nation as a whole. Major recommendations for data development over the decade include strengthening the National Adult Literacy Survey while exploring ways to make it part of a cross-national effort to assess workers' knowledge and skills, and developing benchmarks for the NALS. We also note that a NAEP-like examination of graduating college seniors would be necessary if the Panel is serious about measuring the advanced thinking, communication, and problem-solving skills of the Nation's college graduates.

Endnote

1. A concern with the 1985 assessment is that individuals with limited English proficiency or levels of reading so low they could not complete the survey were excused from taking the assessment. Thus, some experts argue that the present survey slightly overestimates (by about 2 percent) the literacy level of young adults.

Chapter 6
Safe, Disciplined, and Drug-Free Schools

An Interim Report from the Resource Group on Safe, Disciplined, and Drug-Free Schools

GOAL 6: **By the year 2000, every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning.**

Objectives:

- Every school will implement a firm and fair policy on use, possession, and distribution of drugs and alcohol.
- Parents, businesses, and community organizations will work together to ensure that schools are a safe haven for all children.
- Every school district will develop a comprehensive K-12 drug and alcohol prevention education program. Drug and alcohol curriculum should be taught as an integral part of health education. In addition, community-based teams should be organized to provide students and teachers with needed support.

In early 1991, a Resource Group on Safe, Disciplined and Drug-Free Schools was convened by the Panel to recommend indicators and strategies for measuring progress toward achieving this goal. Members of the group are as follows:

John W. Porter	Detroit Public Schools, Detroit, Michigan (convener)
C. Leonard Anderson	Portland Public Schools, Portland, Oregon
Constance E. Clayton	Philadelphia Public Schools, Philadelphia, Pennsylvania
Delbert G. Elliott	University of Colorado, Boulder, Colorado
Joseph A. Fernandez	New York City Public Schools, New York, New York
Michael Guerra	National Catholic Educational Association, Washington, D.C.
J. David Hawkins	University of Washington, Seattle, Washington
Lloyd D. Johnston	University of Michigan, Ann Arbor, Michigan

The Panel and Resource Group welcome your reactions to the Interim Report of the Resource Group on Safe, Disciplined, and Drug-Free Schools.

National Education Goals
Goal Six

Safe, Disciplined, and Drug-Free Schools

I. Introduction

The goal of safe, disciplined, and drug-free schools carries great importance to American young people and the American public at large. The country is now more than 20 years into a costly and tragic epidemic of illicit drug use--one that has probably not been replicated in any other country in the world--and both students and the public have rated it among their top concerns for many years. Safety is another concern of obvious and considerable size, as is the need for sufficient discipline in the schools so that effective teaching and learning can take place.

This goal is important in its own right, of course, but it also has important inter-relationships with the other five educational goals adopted by the Nation. For students to be motivated, clear-headed, and attentive to the educational tasks before them, their minds and bodies must be free of the effects of alcohol and other mind-altering substances. Students must also be free of the fear of being the victims of assault and other criminal acts. Further, an orderly environment, as opposed to a disruptive and chaotic one, is needed to enable young people to fulfill their academic potentials. The closer we come to attaining these three elements of Goal 6, the more likely it is that we will see improved academic performance, more students staying in school, and more of them attending regularly.

Conversely, attaining some of the other goals may help in attaining Goal 6, since poor performance in school--usually beginning at an early age--is a significant predictor of young people's involvement with drugs, delinquency, and disruptive behavior. To the extent that early readiness for school can be achieved, to the extent that young people do better in their coursework and thus experience success, and to the extent that they are less motivated to leave school, we are likely to observe lowered drug use, less violence and crime, and less disruptive behaviors among them.

II. Definitions and Assumptions

A. The Three Elements of Goal 6

There are three distinguishable elements within Goal 6: drug-free schools, violence-free schools, and an orderly environment conducive to learning. The Resource Group has chosen to address each element separately and to interpret these elements as follows:

1. Drug-Free Students and Schools

While a literal reading of the goal suggests that only the schools are to be drug free (which already appears to be largely the case according to research results), we believe that it is more important that the students are drug free, irrespective of where and when they use drugs. If they are coming to school high, hung over, or with other lingering effects on their alertness, cognitive functioning, or motivation, then they are functioning at a below-normal level in school. Thus, the emphasis here is on the students, not just on their in-school behavior.

Unfortunately, American students now have before them a wide array of drugs both licit and illicit, from which to choose. All these drugs adversely affect students' cognitive functioning, social and emotional maturation, physical health, and likelihood of becoming involved with increasingly dangerous drugs. Therefore, the domain of drug-using behaviors should be defined broadly to include not only the clearly illegal drugs, but also psychotherapeutic drugs used outside of medical supervision, as well as inhalants, steroids, alcohol, and cigarettes. While not taken for their psychoactive effects, anabolic steroids can have emotional and behavioral effects as well as serious health consequences. Cigarette smoking, while unlikely to impair academic performance directly, does serve as a "gateway" behavior to the use of other drugs that do have such effects. Further, the schools have an important educational role to play in preventing the onset of smoking--most of which begins in the teen and preteen years--since a continuation of current smoking patterns among American young people will lead to the early deaths of literally millions of the children in school today--as many as 5 million by some estimates.

2. Schools Free of Violence and Crime.

While the goal mentions only violence in its brief wording, the Resource Group interpreted the goal to mean schools free of crime more generally, including the threat of violence as well as theft and vandalism. Because carrying weapons is closely associated with committing the most serious forms of crime, that behavior has been included in the definition of this element of Goal 6, as well.

In contrast to the case for drugs, here it is proposed that the focus should be confined to the domain of the school, since being victimized is an experience, not a behavior, and the school has little influence on this experience beyond its own domain. That domain, incidentally, is interpreted as including being in or around the school, as well as being in transit to or from school, particularly on a school bus. Acts of violence and crime are defined as including acts against the person (e.g., armed and unarmed assault, threats of armed and unarmed assault, sexual assault) and acts against property (e.g., major and minor theft, vandalism).

Unlike most of the other five goals, this element of Goal 6 could be interpreted as applying to school faculty and staff as well as to students. No proposal was offered to measure drug use among school personnel, although a reasonable case for it might be made; but it was felt that the victimization experiences of school personnel should be included in the measurement, not only because of their intrinsic importance for the teachers, but also because such experiences, or fear of their occurrence, can impair teaching performance and thereby have a considerable derivative impact on student learning.

3. *Disciplined Environments Conducive to Learning*

This element in Goal 6 has proven the most difficult to define precisely. There is agreement about what it is not: It is not synonymous with order and quiet in the classroom. Youngsters in an active, at times boisterous, classroom may be learning very effectively, and discipline may be expressed in less readily observable ways. For this reason, it was felt that students and teachers themselves may be in the best position to judge the extent that their learning and teaching environment is conducive or inimical to learning. More concrete measures of behaviors and events may also be used as indicators of a disciplined environment; for example, evidence of disrespect, verbal abuse, and physical abuse in teacher–student and student–student relations would be negative indicators, and an active and constructive interface between the school and parents might be considered a positive indicator. Some Resource Group members felt that high rates of school attendance, by both students and teachers, as well as student punctuality for class, should also be included as positive indicators.

B. The Three Instrumental Objectives for Goal 6

Three objectives are outlined by the Goals Panel as instrumental to attaining Goal 6. The Resource Group for Goal 6 focused considerable discussion on the appropriateness, relative importance, and completeness of these objectives. While acknowledging that they deal with important elements for obtaining the goal, the Resource Group noted some reservations which are outlined below.

1. School Policy on Drugs and Alcohol

The first objective states, "Every school will implement a firm and fair policy on use, possession, and distribution of drugs and alcohol." The 1990 amendments to the Drug-Free Schools and Communities Act require that by October 1990 drug policies and education about the use and possession of drugs be in place if school districts are to be eligible for any Federal education assistance. These conditions make it likely that this objective is already obtained, setting aside the qualifiers in Goal 6 of "firm" and "fair." (Note that defining "firm" and "fair" for measurement purposes would be highly subjective and therefore difficult.) In any case, the U.S. Department of Education will be gathering data on compliance, and no new measurement appears required to measure the existence of policies.

But writing a policy is only part of a more complex process involving the way the policy was developed (which can affect whether parents and students see it as legitimate), the extent to which it has been communicated clearly and fully to students and parents, the extent to which students see it as being enforced and taken seriously by teachers and other school authorities, the extent to which teachers and other staff have been trained to recognize symptoms of use and are able to intervene effectively within the framework of the policy, the extent to which assessment services and referral services (which should be part of the policy) are available and used by the school, and so on. Thus, measuring only the existence of the policy presents a rather limited instrumental objective compared with the full complement of elements necessary for the policy to make a difference in students' use of drugs.

The Department of Education's 1991 First Response School Survey (FRSS) of a national sample of districts, principals, and teachers provides some measures of the extent to which students, parents, and various sectors of the community were involved in developing of alcohol and other drug policies (in the district and principal questionnaires), the extent to which teachers and administrators have received relevant training (in the principal and teacher questionnaires), and the extent to which various student assistance services are available (in the principal questionnaire). This survey also contains other measures of relevance (including whether the district has a written policy). All of these elements might be considered in measuring progress toward this instrumental objective, should the Goals Panel be inclined to broaden its definition of the objective. One or more repetitions of the survey could be considered if it proves particularly helpful. The extent to which students are aware of the policies and believe that they are enforced could be measured longer term in the Monitoring the Future study of annual national surveys of 8th, 10th, and 12th grade students and in CDC's biennial state level surveys of students in grades 9 through 12. (Both of these survey series are described further below.)

2. *Parent and Community Involvement*

The second objective reads, "Parents, businesses, and community organizations will work together to ensure that the schools are a safe haven for all children." This instrumental objective addresses only the violence-free component of Goal 6, although the role of the community in drug abuse prevention is acknowledged later in the third objective. Clearly, the potential contributions of parents and the community are very great, not only for achieving the goal of disciplined, drug-free, and violence-free schools, but also for achieving nearly all of the six educational goals. At the end of this report we suggest that parent and community involvement might be raised to the level of super-objectives, relevant to achieving all goals.

The 1991 Fast Response School Survey mentioned above also contains measures of the extent to which parents and various other sectors of the community assist schools specifically in support of their alcohol, tobacco, and other drug prevention programs. This information is reported by principals and also by whoever completes the district-level questionnaire. Presumably such questions could be included in future FRSS special surveys. While there are no comparable questions asking to what extent these other groups help to bring about a safe environment in the school, such questions could be added to future such surveys to mark progress on this instrumental objective.

3. *A K-12 Prevention Education Program*

This objective reads, "Every school district will develop a comprehensive K-12 drug and alcohol prevention education program. Drug and alcohol curriculum should be taught as an integral part of health education. In addition, community-based teams should be organized to provide students and teachers with needed support."

The need for a comprehensive K-12 prevention program is acknowledged. In fact, the National Commission for Drug-Free Schools (1991) report specifically recommended the program. However, emphasis needs to be given to two words: comprehensive and effective. Comprehensive should be interpreted to mean a program comprising not only elements in the formal curriculum, but also a well-thought-out school policy (already discussed above), a student assistance program, formal in-service training for teachers (and eventually such training required for certification), assessment program, organizational component to deal with drugs, and so on. Effective means that the program, or at the least the elements in the program, are of demonstrated effect. The same National Commission report stressed both of these points. Many schools have curricular programs of unproven effectiveness or proven ineffectiveness; the mere existence of programs is not necessarily a good thing--it may even reflect a waste of resources. Many questions on effectiveness remain unanswered because funding for evaluation has been meager until the past couple of years, but the existing knowledge should be used in whatever program selection or development takes place.

Teaching a drug and alcohol curriculum as part of health education may be a good approach, but the Resource Group feels that it is far too early to name this curriculum as the only good approach, or even the best approach, as Objective 3 seems to do. An infused curriculum or specialized curriculum may be as good or better. There is as yet inadequate evidence upon which to begin homogenizing the country's approach to alcohol, tobacco, and other drug prevention.

As the National Commission for Drug-Free Schools observed, while problems of drug use among our students may be noticed or measured most often when young people are in school, many of the influences that cause drug use are well beyond the boundaries of the school. The family, church, local community, public role models, and the media all play a role in the etiology of drug abuse, and, therefore, all have a potential role to play in preventing it. The same may be said for the other behaviors of special interest here--violence and other crime, and disruptive behavior in school.

Thus, while the schools can and should do a considerable amount to address these problems among our youth, the whole burden cannot be left to them alone. Other sectors, in particular parents, local service and enforcement agencies, and the community at large, are needed as active and invested participants. The schools can play an important role, however, in helping to mobilize and inform these related sectors.

The National Commission recommended a somewhat different model than the one proposed as the third instrumental objective by the Goals Panel. The commission recommended that each school establish a permanent task force to deal with alcohol and other drugs; that it be made up of parents, social service agency representatives, the police, etc., in addition to students, teachers, and school administrators. Further, the commission urged school districts to help launch community-wide leadership groups, which would work independently of the schools but coordinate their efforts with them. Indeed, a number of communities around the country have already launched such community coalitions, including Miami; Washington, DC; Rochester, NY; and Kansas City.

The exact form of such efforts may not be as important as the fact that various elements in the community are mobilized to work in concert with the schools in helping to prevent the use of alcohol and other drugs, and that coordination between the school and community service agencies has been achieved. Thus, a broader measure than that suggested by the objective as currently written would appear to be justified.

The 1991 Fast Response School Survey contains a list of nine possible components of the schools' drug prevention program, which could provide useful information on the degree to which the various elements are present in schools. This information is provided on the district-level questionnaire, which may mean somewhat lower validity in the answers than could be obtained from principals, particularly if the programs vary by school within the district. For longer-term purposes, these questions should probably be asked of principals.

The extent to which drug prevention is taught in all grades, as Objective 3 encourages, can be measured in a question in the FRSS district-level questionnaire. The questionnaire also contains a question on where in the curriculum drug education resides at the elementary, junior high, and high school levels. "Within the Health Curriculum" is one of the answer categories.

In sum, it was felt that a better alignment between the goals and the objectives is possible, and this possibility would influence the nature of what is measured. Clearly, priority should be given to measuring progress on the goal itself, but some useful indicators could be gathered with regard to the objectives, as well. Nearly all of the objectives, however, suffer from the fact that the mere presence of the element (policy, curriculum, community group) does not mean that the element is either functioning or effective. Therefore, merely measuring their presence may lead to a false sense of progress, when in fact the situation may be stationary or even deteriorating. On the other hand, more penetrating measures are more difficult to develop and apply.

Finally, some members of the Resource Group felt that of more importance than the instrumental goals stated may be some that are not stated. In particular, objectives aimed at changing some of the risk factors (or intervening variables) may need to be influenced to bring about changes in drug use, delinquency, or disruptive behavior in school. Such risk factors as not bonding to the school, having high absentee rates, going out on school nights, and not understanding the hazards of drug use are seen as particularly relevant.

C. The Universe of Students of Greatest Concern

1. Age Range

For Goal 6, the recommendation is that, for the most part, the measurement effort should be focused on the secondary school levels--that is, middle schools, junior highs, and high schools. This recommendation is based largely on the fact that the behaviors of alcohol and other drug use, and the experiences of being the victim of violence or other crimes, tend to be concentrated in these age groups. There is also a practical reason, however; gathering data on these subjects directly from students grows more difficult as one moves down to the primary school ages. Quite appropriately, school personnel and parents are more protective of younger students, and the risk of the questions suggesting behaviors that might not have been considered previously grows.

Thus, it is suggested that data gathered on the behaviors and experiences of younger children be confined mostly to those reported by adults in the schools or to retrospective reports of behaviors at earlier ages gathered from students at the middle school level.

2. *Public vs Private*

An important segment (and potentially shifting proportion) of the student population attends parochial and other privately run schools. The recommendation is that these schools be included in the domain of measurement at both the national level and, when possible, at the State level.

III. The 1991 Progress Report

A. Drug-Free Students and Schools

1. *National Indicators*

a. Recommended indicators and data sources. Because of the broad array of factors and outcomes that might be measured with regard to drug use and because measures for three different elements under Goal 6 are needed, it was concluded that a few selected measures should be emphasized, with particular emphasis on outcome measures. Primary would be direct measures of the students' use of drugs. Second would be measures of the peer groups' prevailing norms regarding drug use, which are important because they provide the bulwark for resisting use in the future. Eventually, measures of the frequency of being under the influence of alcohol or other drugs while at school and of the extent of drug sale or distribution at school would be desirable. However, measures of these latter variables must still be developed and implemented. In the interim a measure of use while in school is available and could be used.

(1) **Student use of drugs.** The Monitoring the Future (MtF) surveys of American high school seniors contained the most comprehensive measurement of drug use among American secondary school students to date. This series of annual national surveys, which is being expanded to include 8th and 10th grade students in the spring of 1991, has data available on national samples of 12th graders over the past 16 years (N=16,000/yr.) and, thus, provides the opportunity to put the changes during the present decade into longer-term historical perspective. Because its measures of drug use also have been used to develop

national measures in other countries, particularly in Western Europe, the MtF also offers the possibility of putting the American results into international perspective.

The 8th and 10th grade data will not be ready in time for the September 1991 Progress Report, but they will be by 1992. Meanwhile, data from a national survey of 8th and 10th grade students in 1987, using highly comparable measures to MtF from the National Adolescent School Health Survey (NASHS), could be used to provide some benchmark measures.

The MtF survey contains measurements for the use of any illicit drug other than marijuana, as well as for a host of specific drugs including marijuana, cocaine, crack, hallucinogens, LSD, heroin, "ice," inhalants, and the nonmedically supervised use of stimulants, sedatives, tranquilizers, and opiates. Alcohol and tobacco use are included, as well as anabolic steroid use. The study also has questions on the grade in which the student first used these drugs. When applied to 8th grade students, this grade of first-use measure can provide a time-lagged measure of drug initiation rates at lower grades. For example, the 1992 data from 8th graders could be used to calculate the lifetime prevalence for 6th graders in 1990. This type of approach is recommended for estimating drug use levels at lower grade levels. Because of the broad array of substances abused by American school children and the likelihood that still others will emerge, such comprehensive coverage is important, even though some simplifying indexes will probably be needed for the Progress Report itself.

(2) **Peer norms.** Among the environmental and psychological measures in the Monitoring the Future study directly related to drug use, are the perceived atitudes of friends concerning the use of the various licit and illicit drugs. The answers are given in terms of the degree of peer disapproval that could be expected in response to various drug-using behaviors. Again, these excuses have been monitored for 16 years, during which considerable changes have taken place. These norms set the first line of defense against any renewed epidemic use of these drugs.

(3) **Drug use in school.** The Resource Group felt this behavioral measure should be replaced in the longer term with a measure of being under the influence of alcohol or other drugs at school, which was judged to be the most relevant for school performance and more important than where the drugs are actually taken. In the interim, however, a set of measures on the prevalence of use during the past year at school exists for alcohol and other drugs in the MtF data set and could be reported through 1990. Generally speaking, these rates tend to be quite low.

b. Indicators and data sources considered but not recommended. A number of predictors of use or risk factors were considered for inclusion, but were judged less important than those listed above. However, many are important social and psychological factors judged by the Resource Group to be important in attaining the outcomes just discussed. Among the psychological risk factors seriously considered were students' beliefs about the dangers of using various drugs (which have proven to be important determinants of use), their judged ability to resist peer pressure to use, their stated willingness to use, and their norms against deviant behavior generally. Among the environmental risk factors judged to be of particular importance were the perceived availability of drugs, the extent of active parental monitoring of behavior, and the availability of counseling, referral, and student assistance programs. A number of these variables are currently measured in the MtF study and could be added as indicators here, should that be judged desirable.

As to measures not used for the three outcome variables that were chosen for the Progress Report, the use of systems that ask students or teachers to report their judgments of the extent of drug use, for instance, was not felt to be as reliable or accurate as direct self-report measures. Thus, these measures are not recommended.

The Youth Risk Behavior Surveillance System (YRBSS) does provide self-report measures on a number of the drugs of interest here, using a subset of questions drawn largely from MtF. This annual national survey of students in grades 9 to 12 was begun in 1990 and provides directly comparable results between its National- and State-level samples (which occur biennially on odd-numbered years in a limited number of States so far). YRBSS, however, provides data on smaller national samples (N=12,000/yr.) and on a more delimited set of drugs than MtF, and thus was judged to provide measures on this goal that would not be as comprehensive or quite as stable as those from MtF (N=48,000/yr.). YRBSS is recommended as the best available vehicle for measuring progress at the State level, however. (See below.)

Consideration was also given to the desirability and feasibility of monitoring the alcohol- and other drug-using behaviors of faculty and staff in the schools. Monitoring is seen as highly relevant both because such use may impair teaching performance and because teachers and other school staff serve as important role models for their students, and an observable contradiction between their behavior and their prevention messages will obviously undercut the latter. However, the feasibility of surveying teachers regarding their own behaviors was judged to be low, since cooperation problems could be expected and a whole new level of expensive data systems would need to be mounted. Therefore, ongoing Department of Education surveys might include more general questions to determine the extent to which respondents see teacher or staff behavior being impeded by the use of alcohol or other substances. Such measures could provide a more general and indirect measure of the problems.

2. *State-Level Indicators*

a. Recommended data sources

(1) **Student use of drugs.** Because there are 50 States, the measurement costs of adding new data collections on 50 representative State samples are very considerable, not only in terms of dollars, but in terms of student and staff time. For this reason the Resource Group has leaned heavily toward using existing data collection systems, particularly at the state level, and particularly toward ones that are comparable with the recommended national data collection system (or at least have that possibility). In the area of substance use, CDC's Youth Risk Behavior Surveillance System seems most promising, because CDC is encouraging and helping States to apply the survey instrument at the State level. This instrument already contains some drug use measures drawn from Monitoring the Future, although the list is not as comprehensive as MtF's and has been slightly revised. YRBSS has questions on the use of marijuana, cocaine, crack, other illicit drugs taken as a whole, steroids, alcohol, and cigarettes. While there may not be room for much expansion of the coverage (for example, to include hallucinogens, inhalants, heroin, other opiates, "ice," and the various psychotherapeutic drugs), the key drugs included are probably adequate for assessment purposes at the State level.

Not all States are using this survey, which is administered biennially on odd-numbered years, and only limited standardization of survey procedures has as yet been attained at the State level. However, the survey was conducted in 30 States during 1990, its first year, with half of the participating States selecting representative samples. CDC is encouraging the participation of all States and the improvement of survey procedures over time. The Resource Group would encourage the states to work toward more standardized and rigorous procedures to develop data that can be meaningfully compared across time and against the national data.

Many States may want to report these drug use data for the 1991 Progress Report, although it should be added that a number of States have their own statewide surveys of student drug use--many using measures drawn from MtF. Those that have recently conducted their own surveys of student drug use may prefer to base their reporting on those surveys, although comparability with the MtF national results will vary by State.

(2) **Peer norms.** YRBSS does not now have questions on this subject, nor does any other widely used State-level survey. Some States may have adopted these

questions from MtF in their own drug abuse surveys, but these will be the exception.

(3) **Use of drugs at school.** The same situation exists for these measures as for peer norms.

b. Data sources considered but not recommended. Some measures have had widespread use, but usually are not applied to representative State samples. For that reason and others, these measures have not been recommended here. However, if these measures have been applied to a representative sample in some States, those States may wish to use them to measure their progress on this element of Goal 6.

B. Schools Free of Violence and Crime.

1. National Indicators

Fear for personal safety may become an overriding concern for staff and/or students, inhibiting teaching, learning, and even attendance. Thus, it is important to measure staff and student feelings of personal safety in school and in the school neighborhood that must be traveled to get to or from school. An adequate assessment of the degree to which schools are free of crime and violence requires measuring the incidence of victimization actually experienced by staff and students at school and on the way to and from school. Weapons in schools, whether carried to reduce fears for personal safety or for other reasons, represent a threat to the actual safety of the other members of the school community. Therefore, measuring the extent of weapons possession in school is recommended.

a. Recommended indicators and data sources.

(1) **Victimization in school.**
Students. MtF contains a battery of seven questions in which students report the frequency with which they have been the victims of crime and violence in school (or on the way to or from school) during the prior 12 months. These questions cover being the victims of major and minor theft, vandalism of one's property, injury and threat of injury with a weapon, and unarmed injury or threat of injury. Long-term trends in these variables can be reported up through 1990 for high school seniors and, starting in 1991 surveys, comparable measures will be available for 8th and 10th grade students. There is also a measure of vandalism of school property in MtF that should be reported along with personal victimization measures.

Teachers. Regarding the victimization of faculty in the school, in the spring of 1991 the U.S. Department of Education's Fast Response Survey System (FRSS) will carry out a national survey of school systems which deals with the themes in Goal 6. The teachers questionnaire contains six questions of direct relevance here. These questions ask the lifetime prevalence of verbal abuse, threat of attack, and attack by students, and the frequency of these same experiences in the prior 12 months (in the case of attack or threat of attack) and in the last 4 weeks (in the case of verbal abuse). FRSS is described as a one-time policy-oriented survey, but some of its results will be very useful for the 1991 Progress Report; the most relevant items could be included in future Schools and Staffing Surveys (SASS) in the teacher questionnaire, or might be included in a subsequent FRSS survey devoted to this topic again.

(2) **Feeling safe at school.**

Students. The School Crime Supplement (SCS) to the National Crime Survey conducted in 1989 contains some highly pertinent questions asked of students, including the frequency of fear of attack at school and on the way to school, and the frequency of staying at home because of fear of attack at school. Finally, SCS asks whether various areas in the school, or on the way to or from school, are avoided because of the fear of attack. Students aged 12 to 19 (N=13,000) are asked these questions in a household survey. These data should be included in the Progress Report.

Teachers. FRSS contains four questions that ask teachers how safe they feel in the school building during and after school hours, on the school grounds, and in the school neighborhood. These questions would be quite appropriate to include.

(3) **Carrying weapons to school.** The 1989 SCS asked students the frequency with which they had brought weapons to school over the prior 6 months and the types of weapons they brought. Assuming that the answers to these questions, which were asked in an interview situation, are valid, the answers should measure the information needed quite directly.

b. Considered but not recommended. Administrative reports of school safety, victimization, and weapons possession from buildings and districts are influenced by many factors other than the actual prevalence of these problems. Therefore, it is recommended that to the extent possible, the data used in both the 1991 Progress Report and in the long-term data system not be based on administrative reports but be gathered directly from probability samples of teachers and students.

Continuing survey series have been generally preferred over one-time surveys when their measurement coverage was roughly comparable, because the survey series will allow the Goals Panel to stay with the same indicators longer term. One example of a noncontinuing survey is the School Crime Supplement to the National Crime Survey, which has been conducted only once so far, in 1989. Like MtF, this survey asked about the frequency of robbery involving weapons, threat of force, or use of force while at school; the frequency of theft of possessions at school; and the frequency of physical attack at school and physical attack requiring medical attention. (The timeframe for these questions was the prior 6 months.) However, because it is not clear whether, or how frequently, the SCS might be repeated, the SCS was not recommended for use here. There is also some concern about the validity of such information when gathered from children in a household setting with parents nearby.

2. *State-Level Indicators*

The data systems just recommended as sources of national data do not generate data on State samples, nor do they have counterpart studies at the State level. Thus, no measures regarding violence and crime, feelings of safety, or carrying weapons can be included at the State level for the 1991 Progress Report.

C. Disciplined Environments Conducive to Learning

1. *National Indicators*

To define what constitutes a "disciplined environment conducive to learning" is a challenging task. Some argue that it should incorporate factors such as the physical environment, e.g., whether the school buildings are clean, bright, well-maintained, and adequate in size. Others argue that is should include factors related to the organizational climate, e.g., whether a positive and constructive relationship exists between faculty and administrators, faculty and parents, faculty and students, and among the various members of the faculty. Still others argue that student and teacher absenteeism, student tardiness, and homework completion by students are indicators of an orderly environment. Nearly everyone would agree that the learning conditions inside the classroom during school hours, including excessive noise, fighting, and other disruptions, should be included.

The Resource Group was not able to reach consensus on how broadly to define this element of Goal 6. Consensus was reached on specific issues, however. First, there is full agreement about the importance of measures based on perceptions as well as behaviors, since students and teachers themselves may be the best judges of whether conditions in the school environment are conducive to or disruptive of their learning and teaching, respectively.

With regard to behaviors, student misconduct would be measured and reported in terms of the frequency of definable events. Measures should include reports of class disruption, teacher harassment, and other items common to most student conduct codes.

Some members of the group recommended inclusion of school attendance, class cutting, and tardiness as appropriate indicators for this goal, but others argued that conceptually these behaviors are not measures of a disciplined environment per se. These issues are raised again in Section IV of this report under a discussion of "super objectives."

Research by the National Association of Secondary School Principals School Climate Task Force suggests including measures of student productivity as well as measures of student/teacher satisfaction in descriptions of the school environment. The Resource Group did not reach consensus on this issue. Some place primary emphasis on "disciplined environment"; others underscore the importance of "conducive to learning" and would recommend the included student productivity measures such as completion of homework and in–class assignments, time on task, and other student-engagement measures.

a. Recommended indicators and data sources

(1) **Student misconduct in school.** To some extent there is an overlap between this element of Goal 6 and the previous one dealing with schools being free of violence and crime. Events such as verbal abuse of teachers by students, student threats of injury to teachers, and actual physical attacks on teachers are all relevant to defining an orderly environment conducive to learning. Not only is teacher safety affected by such misconduct, but the learning environment for other students is, as well.

Additional elements of student misconduct can be measured, of course. Students can be asked directly about such behaviors as not cooperating with teachers, not following instructions in class, being disruptive in class, cheating on tests, copying other people's homework, verbal and physical altercations with other students in class, and so on. There can be little doubt that these features of the school environment are not conducive to learning, either by the "perpetrators" or by the other students in the class. At present, no single data source appears to have a good set of measures of these student behaviors. MtF does contain two questions regarding the extent to which student norms support cheating and noncooperation with teachers: These are available only for high school seniors until after 1991. The National Educational Longitudinal Study for 1988 (NELS:88) contains questions in its 1990 followup survey about whether students feel that it is "OK" to cheat on tests, copy other people's homework, cut classes, cut school, or be late for school. The study also has two questions on misbehavior in class by other students and one on whether they tend to get away with misbehavior. These questions could be used in the 1991 Progress Report, although the study is not appropriate for long-term monitoring. NELS:88 is a panel study of a national sample from a single-class cohort who were in 10th grade at the time of the 1990 data collection.

(2) **Student and teacher perceptions of noise and disruption impeding learning.** The most desirable method for measuring change across time in student and teacher perceptions of what they define as noise and disruption is to ask them about the frequency of such occurrences. Such a measurement approach generally has not been adopted to date in student and teacher surveys that provide national data. NELS:88 has two questions in its student questionnaire that ask, on an agree-disagree scale, whether "other students often disrupt class" and whether "disruptions by other students get in the way of my learning."

The teacher questionnaire for the 1991 FRSS asks teachers to what extent student misbehavior and student disruptive behavior interfere with their teaching. There are also questions on how serious student tardiness and student absenteeism/class cutting are as problems in the school. Again, none of these questions request frequency of occurrence, which would be preferable for measuring change over time because the meaning of the scale is more likely to remain constant; but they still could provide interesting and useful data for the 1991 Progress Report.

(3) **Other indicators.** If the Goals Panel decides to include measures of tardiness, skipping school, skipping class, hours spent on homework, or homework completion in the indicators of this element of Goal 6, some national measures do exist. MtF has measures for high school seniors in the class of 1990 (and for 15 senior classes prior) of the frequency of skipping whole days of school and skipping classes. MtF also measures hours per week spent on homework.

b. *Considered but not recommended.* Again, information from administrative reports was considered and rejected. Simply collecting administrative data on the number of violations of school codes would provide an unreliable measure of student misconduct, because school codes vary across schools, systems, and time.

2. State-Level Indicators

None of the data sources recommended for use at the national level have counterparts at the State level now. The only data collection system with relevant State-level data is the Schools and Staffing Survey. The SASS teacher questionnaire contains a few questions about the level of student misbehavior, the consistency of rule enforcement by teachers, and tardiness and class cutting by students interfering with teaching. Unfortunately, these questions are on an agree-disagree scale, which makes comparisons across States or over time difficult, because teachers' standards can differ or change with time. The same type of problem exists for a set of questions on student tardiness and absenteeism, teacher absenteeism, students cutting class, and fights among students. These problems are all rated on a scale measuring how "serious a problem" each is. Nevertheless, because these questions are available on national and State levels (only public schools are included at the State level), the panel may wish to report the results on these three questions in the 1991 Progress Report. At least they give some idea of how the teachers see things.

IV. Design for a Longer-Term Data System

As the discussion in the last section indicates, there are clear needs for improving existing data systems if progress toward Goal 6 is to be measured accurately and completely at both the national and State levels. While substance use and student victimization in school are fairly adequately measured at the national level in ongoing data systems--in particular, Monitoring the Future--this measurement might be expanded somewhat. Substance use is not, however, being measured completely at the State level in terms of coverage of all states, coverage of all the indicators, or comparability and adequacy of measurement procedures across States. Victimization in school is not being measured at all at the state level, as best we can determine.

As mentioned earlier, behaviors such as substance use and events such as victimization are best measured by asking the individuals to report on discrete occurrences--thus, student surveys provide the best approach. To avoid the expensive proliferation of State-level student surveys, the Resource Group recommends using one study that is now being put in place at the State level, the Youth Risk Behavior Surveillance system, to measure these two elements. Use of YRBSS would require modest expansion of the content coverage of the questionnaire--but not an expansion that is incompatible with the current instrument (which deals with substance use, trauma, suicide, sexual behavior, and nutrition) nor one that should prove detrimental to the original purposes of the study. In fact, such an expansion to provide measurement for Goal 6 would very likely increase the States' motivation to cooperate with the survey and to implement it with greater methodological rigor. The specific suggestions regarding additions to this survey are given below, but it is worth mentioning here that the Resource Group sees a need for a number of States to improve the way in which their samples are drawn and their data are collected, if this system is to yield meaningful State-level data for Goal 6. (CDC does make sampling software and a procedures manual available to the States.)

A. Drug-Free Students and Schools

1. National Indicators

a. Recommended indicators and data sources. For this goal some of the same measures and data sources recommended for the 1991 Progress Report are also recommended for retention longer term, but some new indicators are proposed as well.

(1) **Student use of drugs.** Continuation of the Monitoring the Future measures of use and grade of initiation of use (to provide lagged measures of changes at lower grades) is recommended. If new classes of drugs come on the scene, these drugs will be added to the measurement package as has been done in the past.

(2) **Peer norms.** Again, continuation of the MtF measures should fill this need at the national level. The extent of friends' disapproval is gathered for different levels of involvement (e.g., experimentation, occasional use, and regular use) for a number of drugs, including alcohol and cigarettes.

(3) **Being under the influence at school.** This indicator is not currently a part of any ongoing national data collection system, which is based on self-report. Therefore, adding three questions to the MtF surveys is recommended: frequency of being under the influence of alcohol while at school, frequency of being under the influence of marijuana or any other illicit drug while at school, and frequency of smoking while at school.

With regard to teacher behavior, the approach of using staff respondents as observers of such behaviors among the staff generally could be adopted and the appropriate questions included in the Department of Education's Schools and Staffing Survey (SASS). This approach would permit biennial measurement beginning in 1991. Some concern was expressed with the rather pliable nature of the response scale to be used in that survey series, but presumably a different one could be introduced for these three questions.

(4) **Sale or distribution at school.** Sale and distribution is an illegal activity that can and does occur in the school's domain. There is at present no measurement of these behaviors at the national level. We recommend that a few questions be added to MtF about student awareness of drug dealing or distribution occurring in or near school. Direct self-reports are not suggested primarily for practical considerations: such questions are likely to arouse the suspicion of student respondents to the point where they become uncooperative with the survey in general.

2. *State-Level Indicators*

It appears that enough of these indicators could be added to the CDC's Youth Risk Behavior Surveillance System to provide an adequate, though more limited, measurement package than at the national level. Some States may choose to continue to rely on their own periodic statewide surveys of drug use for measuring progress against this element of Goal 6. Those that do may wish to consider adding some of the measures on "victimization in school" and "disciplined environment" to cover progress on the other two elements of Goal 6 as well--particularly if they are not expecting to implement the YRBSS on representative samples in their own State.

a. Recommended indicators

(1) **Student use of drugs.** The drug use measures already in YRBSS could serve rather well for State-level assessment. Serious consideration should be given to making the measurements comparable with the MtF survey on an item-by-item basis in the absence of compelling reasons to the contrary, at least on the key measures. States with their own series of student surveys on drug use may wish to make their measurements comparable with MtF for obvious reasons. A method exists for "splicing" trends from previous measures with those obtained with new measures by splitting the sample into random halves in one year and using the old questions with one half and the new ones with the other.

(2) **Peer norms.** No State-level measures currently exist here, except perhaps in a few individual States with their own student survey series on drugs, but a very few questions from the larger set used in MtF might be added to YRBSS and/or State-specific surveys.

(3) **Being under the influence at school.** The same three questions proposed above for addition to MtF for national monitoring purposes could be added to YRBSS and any State-specific surveys; i.e., questions on frequency of being under the influence of alcohol at school, being under the influence of marijuana or other illicit drugs at school, or smoking cigarettes at school.

(4) **Sale or distribution at school.** Again, the few items to be added to MtF could be considered for inclusion in YRBSS and in State-specific surveys.

B. Schools Free of Violence and Crime.

The indicators being recommended longer term for this element of Goal 6 are much the same as those proffered for the 1991 Progress Report, the main difference being that some of them are now recommended for inclusion in ongoing data collection systems.

1. National Indicators

a. Recommended indicators and data sources

(1) **Victimization in school**
Students. The battery of seven student victimization items and one school property vandalism item in MtF should be retained and perhaps expanded if any additional victimization experiences are judged important for inclusion. Data on these items will then be available annually, beginning in late 1991, for 8th, 10th, and 12th grade students in public and private secondary schools nationwide.
Teachers. The Schools and Staffing Survey could adopt the teacher victimization items included in the special 1991 Fast Response School Survey on violence in the schools, because the latter system is not intended to provide monitoring on an ongoing basis. These items would then be available on a national and State basis every other year, starting in 1993.

(2) **Feeling safe at school.**
Students. The 1989 School Crime Supplement to the National Crime Survey provided the measures of students' feelings of safety at school proposed for inclusion in the 1991 Progress Report. However, it is not clear whether, or how often, this supplement might be repeated. Further, there was some concern about the validity of such information gathered in the household setting. The most central questions used in the SCS could be included in the MtF series, which would provide annual measurement at the national level.
Teachers. The questions in FRSS on teachers' feelings of safety in or near the school are excellent. Because FRSS is not intended for monitoring, some or all of these questions should be considered for inclusion in the Schools and Staffing Survey, which would provide both national and State teacher data on a biennial basis.

(3) **Carrying weapons to school.** The 1989 School Crime Supplement, which is the preferred data source for he 1991 Progress Report, contained two excellent questions on this subject. Again, assuming that SCS will not be repeated, or in any case not often enough, one or both of the questions could be adapted to the MfF series for assessment on an annual basis. It has also been argued that

reporting on such deviant behavior is more likely to be valid in a school survey setting than in a household one.

b. *Considered but not recommended.* Once again we have chosen to avoid the use of system-level records for the reasons given earlier. We have also avoided recommending the launching of new data-gathering series and have advised against reliance on one-shot or infrequently conducted studies, such as the School Crime Supplement and the FRSS.

c. *Other issues.* The opposite side of the coin from victimization is the perpetration of crime. While reducing the criminal behavior of students is not one of the goals or objectives laid out by the Goals Panel, it may be one they would wish to consider. MtF already gathers data each year on a substantial number of delinquent acts (not specific to school), and the addition of others might be suggested based on Elliot's National Youth Survey, which is a panel study of delinquency and substance use among a set of adjacent birth cohorts passing through adolescence.

2. *State-Level Indicators*

The two State-level data systems most likely to implement measurement in this area are the Youth Risk Behavior Surveillance System of students and the School and Staffing Survey of teachers.

a. *Recommended indicators and data sources*

(1) **Victimization at school.**
Students. YRBSS could adopt the seven-item scale of victimization in school now used in MtF, thus creating integrated national and State data.
Teachers. SASS could adopt questions used on the 1991 FRSS survey of teachers, as has already been proposed for the national level.

(2) **Feeling safe at school.**
Students. Just as MtF could adopt selected questions in this domain for measurement at the national level, so could YRBSS add them to their State-level surveys (or at least provide them to the States as an optional component). Comparable data would then be available at the national and State levels.
Teachers. Questions for FRSS have already been recommended for the teacher questionnaire of the national biennial SASS surveys. These are conducted at the State level, as well.

(3) **Carrying weapons at school.** Again, the same one or two questions drawn from the School Crime Supplement to be added to MtF could be added to YRBSS (or offered to States as optional components), providing comparable State-level data in most States.

C. Disciplined Environment Conducive To Learning

Because a question remains regarding how broadly to define this element of Goal 6, the Resource Group needs some instruction from the Goals Panel. The issues are laid out in Section III C in the discussion of the 1991 recommendations. For the moment, the Resource Group will take a fairly narrow interpretation of the term "disciplined environment conducive to learning" and recommend measurement of student misconduct in school and student and teacher perceptions of noise and disruption impeding learning.

1. National Indicators: Recommended indicators and data sources

(1) **Student misconduct**. Measures of student behaviors such as not cooperating with teachers, not following instructions in class, being disruptive in class, cheating on tests, copying others' homework, having verbal and physical altercations with other students in class, and having verbal and physical altercations with teachers in class should be included as measured variables. Perhaps the best approach for some of them is to ask how often these incidents happen in the student's classroom, while a few of the less visible behaviors (such as cheating and copying homework) may be best approached in self-reports of the respondent's behavior.

The few questions in this domain mentioned for the 1991 Progress Report are located in Monitoring the Future and NELS:88. Because the NELS:88 is not an ongoing monitoring system, it is recommended that a set of questions in this domain be selected and/or developed and inserted into the MtF survey.

(2) **Student and teacher perceptions of noise impeding learning**. As was discussed in Section III C, the Resource Group considers measures based on frequency of occurrences to be the most appropriate for measuring change over time, as well as differences among States, because the standards for other Likert-type scales (e.g., "how big a problem is it," "to what extent is it a problem") can vary between populations and across time. The data sources available for the 1991 Progress Report were the 1990 NELS:88 and 1991 Fast Response Survey System, neither of which uses a frequency of occurrence scale on the few measures they do have of perceptions of noise and disruption impeding learning. Further, NELS:88 is not an ongoing monitoring system.

Thus, the Resource Group recommends new measures and new placements of them. Specifically, a very few questions (with parallel wording for students and teachers) could be added to the MtF series and the SASS series (and/or repeats of the 1991 FRSS survey). These questions would ask how frequently the classroom situation becomes so noisy and disruptive that it interferes with learning and teaching. The results on these measures could be expected to correlate strongly with the direct measures of student misconduct just discussed.

(3) **Other indicators**. Should the Goals Panel choose to broaden the definition of a "disciplined environment conducive to learning" to include measures of tardiness for school and/or class, skipping school and/or class, hours spent on homework, and completion of homework, some measures currently in MtF could be used. Measures on homework completion and tardiness would need to be added. Because MtF has included a number of these measures for 15 years in the surveys of high school seniors, changes during the 1990s can be put into a longer-term historical perspective.

2. *State-Level Indicators: Recommended data sources and measures*

Once again, use of the CDC's Youth Risk Behavior Surveillance System is recommended for gathering State-level student data on at least some of the same measures that are recommended for addition to Monitoring the Future surveys. (YRBSS may or may not choose to add these to its national high school survey component but could at least offer them as an optional component in the State-level measurement package.) The teacher questionnaire in the Schools and Staffing Survey is recommended for gathering the comparable teacher data at the State level. The measures would be the same as those gathered at the national level.

V. Additional Recommendations

A. Backup Technical Report

The Resource Group recommends the creation of a more detailed technical report to supplement the necessarily oversimplified Progress Report. Under Goal 6, for instance, it might contain item-level trends for use of the different drugs, various types of victimization, various types of disorderly behavior in school, etc. The report also might contain data on the risk factor and precursor measures that reflect variables not included in the annual Progress Report, but which deal with conditions that must be changed in order to influence drug use, crime and violence, and orderliness in the school environment constructive to learning, for example, student bonding to school and commitment to learning, community mobilization, etc.

B. Super Objectives That Crosscut the Six Goals

The Goals Panel may wish consider adding some measurable objectives that would be relevant to attaining Goal 6, but that also would be relevant to attaining most of the other goals, as well. These objectives would include such factors as bonding to school, feeling successful in school, being committed to learning, low truancy and tardiness rates, developing norms against deviant behavior, etc. They might also include parent involvement in the children's education and school, and the development of community support for and cooperation with the activities of the school.

C. Local Data Collection

Understanding that the President and Governors set these goals and will issue these reports on the State and national levels, the Resource Group was also mindful that success or failure in Goal 6 would largely depend on local efforts. Local districts and schools also need good data to assess their needs and gauge their own progress. The Resource Group therefore recommends that appropriate instruments and procedures be made available to, and their use be encouraged by, interested districts and agencies. For example, the Michigan Department of Education has developed a comprehensive package for a student survey compatible with the MtF measures, and a school prevention program assessment inventory. The package incorporates the use of standard sampling techniques, data collection procedures, and reporting methods through the use of an outside contractor whose services are available at low cost to school districts throughout the State. While the content emphasis is on substance abuse, the other elements of Goal 6--crime and a disciplined environment--could readily be woven into that effort or others like it.

PUBLIC TESTIMONY

Instructions: How to Submit Written Testimony for Panel Consideration

The National Education Goals Panel (NEGP) would like to receive testimony from all individuals and organizations wishing to comment on the selection of indicators, data sources, and measurement strategies relating to the national education goals for the September 1991 and future annual NEGP Progress Reports.

To submit testimony for the Panel's consideration please fill out the form on the opposite side of this page. You may photocopy the form and use both sides of the page, submitting a separate double-sided page for each goal upon which you want to comment. You may also submit one double-sided page to make general comments.

You may attach additional written material, but only information submitted on the NEGP Public Testimony Form by May 12 will be summarized and reported to the Panel. This summary and highlights of individual testimony will be given to the full Panel before they make their decisions regarding the selection of indicators and data for the September 1991 Progress Report and future reports. Testimony submitted after May 12 cannot be considered regarding initial decisions about potential indicators and measurement strategies for monitoring progress toward the National Education Goals.

Using the Written Public Testimony Form, please identify the individual and, if applicable, the exact organization or affiliate submitting testimony with the appropriate address, telephone number and Fax number. Also indicate the specific goal addressed by your comments.

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NATIONAL EDUCATION GOALS PANEL
Written Public Testimony Form

To have your comments considered by the National Education Goals Panel, please complete this form. You may photocopy it and write front and back, submitting one two-sided page for each goal. You also may submit general comments. Please submit this form by May 12 to:

National Education Goals Panel
Written Public Testimony
1850 M Street, NW, Suite 270
Washington, D.C. 20036

FROM:
Name: ______________________________
Organization (if any):______________________________
Address: ______________________________
____
Telephone ______________FAX______________

SUBJECT: (Check appropriate space)
Goal 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ All __ Other ____________
Back-up Paper submitted ___ Title ____________________
Topic: ______________________________
Regional Forum (place, date, if appropriate) ________________